American Machinist

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Shop Equipment Review

Semi-annual résumé of machines, tools and accessories described in the Shop Equipment News section of the American Machinist during the last six months of 1924

Principal Developments in Shop Equipment

THIS issue of the *American Machinist* is the fourth semi-annual review number. Now that statistics for two years are available, something may be learned from a backward glance at numbers. By six-month periods, beginning with January, 1923, the numbers of "new tools" brought out were 265, 219, 240 and 266, an average of about 500 per year.

Of the individual kinds of tools grinding machines led in all except one period with 25, 22, 29 and 18. Drilling machines were second with 15, 18, 16 and 23; and lathes third with 19, 16, 20 and 11.

Motor Drive and Ball Bearings

In a survey of the shop equipment reviewed in this issue, two trends are striking, namely the use of the motor drive and the use of ball bearings. Of 95 machines that can be classified as machine tools proper 70 per cent are motor-driven. Of 84 machines on which ball bearings could be used 30 per cent are equipped wholly or partly with that type of bearing.

Prominent electrical features other than motor drive are the increased use of push-button control, electric control on the apron for lathes, silent chain drive used with motors, rapid traverse by motor of tool heads and carriages, and the use of individual motors for separate functions.

Examples of the feature last named are a thrust-washer grinder with a motor driving each spindle and a third motor operating the feed mechanism; a locomotive-rod boring machine with a motor for each spindle; a ball-race grinding machine with one motor for the wheel and another for the work and the member carrying the work head; a grinder with a motor for the work spindle and another for the wheel spindle and the other movements; a wide-wheel, in-feed grinder with one motor for the wheel spindle, another for the work headstock and a third for the power-feed arrangement; a tool and cutter grinder with individual motors for wheel and work; and a locomotive piston-rod grinder with separate motors for driving work and wheel.

Gearing and Lubrication

In almost every case where gears are grouped they are arranged to run in oil or to have oil pumped over them. Lubrication is by both splash and pump. Greater coolant capacity is being provided, systems that pump from three gallons per minute up being in use. Friction and disk clutches are used extensively. Helical and herringbone gears are being used in heads.

Direct-reading instruction plates are being provided more extensively. Another labor- and time-saving feature is the increased use of power rapid traverse for heads, tables and carriages. Simplified and error-proof construction grows in favor, "one-lever control" receiving further adoption.

Machines directed more especially at the automotive shops include a machine for drilling the hubs of disk wheels, another for line drilling (from which it takes its name), and another for operations on cylinder blocks for valves and valve stems; a crankshaft lapping machine; a double-spindle ring-wheel grinder for valve-sleeve parts; a cylinder grinder; a gear generator; a "production" lathe; and a hollow-spindle lathe for crankshafts.

For the railroad shops there were provided a portable journal-turning machine; two locomotive-rod boring machines; a plain radial drill; a piston-rod grinder; a portable crank-pin lathe; and others.

Features of Individual Machines

Some of the outstanding features of individual machines compel attention, for example: A wide-wheel, in-feed grinder, with reciprocating spindle and half-box bearings for the wheel spindle. A gear generator designed primarily for automobile transmission gears, with a cutter head in one piece and with a housing completely surrounding the hob and the work, to eliminate overhang and provide additional bearing for the work slide against the top of the housing. A tool room lathe with the entire relieving attachment located at the rear of the machine. A simplified milling machine with the speed box equipped with roller bearings, a fly-wheel, a table at a fixed height and a vertically-feeding head. A planer with the cross-rail a self-contained unit, carrying all mechanism for power rapid traverse of heads, vertically and horizontally and for elevating and lowering the cross-rail, and using the method of "one-lever" control. A centerless grinder to finish tapers, shouldered pieces and irregular contours.

There is much of interest to be found under the classification "Miscellaneous Equipment and Supplies." Small tools should not be overlooked. Measuring and testing equipment is of interest, including as it does three machines for measuring threads by the comparison method. Heat-treating equipment includes two electric furnaces. Materials handling machinery is in evidence. Four speed reducers were marketed. Welding equipment includes four butt welders, a spot welder and a rim welder.

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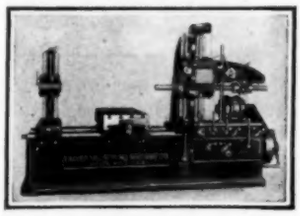
Boring Machines

— 1 —

Boring Machine, with 2½-In. Bar, "Tri-Way"

Universal Boring Machine Co., Hudson, Mass. [Vol.61, p.402.]

This is a small size of the "Tri-Way" boring machine, embodying the same principles of construction as the larger machine but with a more limited range, and with added features in the way of ease of control and manipulation. This machine has a bar 2½ instead of 4 in. in diameter. The speeds range



from 16 to 650 revolutions per minute. All gears are of steel, and all sliding gears have rounded-end teeth and are heat treated. All speed and feed gears are contained in two separate boxes, each assembled as a unit. All gears run partly submerged in oil.

Position of the bar is always under control of the operator through the large capstan wheel on the head. The smaller capstan engages the feed by means of a positive clutch. The selective gears in the gear boxes cannot be moved without disengaging the driving clutch. The specifications of the machine are as follows: Diameter of bar, 2½ in.; taper hole No. 4 Morse; endwise movement of bar for feeding, 20 in., increased by resetting to 36 in.; power traverse (for standard length of bed) 24 in.; power cross-feed, 32 in.; power vertical feed, 20 in.; maximum distance from table surface to center of bar, 21½ in.; greatest distance from faceplate to outer support (standard length of bed), 48 inches.

— 2 —

Boring Machines, Drilling and, Line

Rockford Drilling Machine Co., Rockford, Ill. [Vol.61, p.977.]

This series of line boring machines is adapted for practically any kind of boring operation on a production basis. The arrangement of the spindles in these machines can be made to suit the work to be done. Provision is made for motor drive, the motor being

mounted inside the base and connected to the drive box through a clutch. All drive and feed gears are enclosed in an oil-tight box and are made from heat-treated steel. The control mechanism for drive and feed is located at the front of the machine in a convenient position. The spindle heads are fitted for rapid approach, forward feed and rapid return, together with hand feed in either direction.

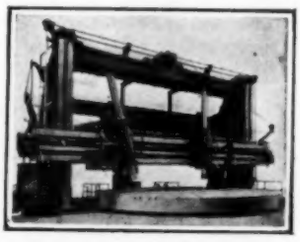
— 3 —

Boring Mill, 36-Ft.

John Bertram & Sons Co., Dundas, Canada. [Vol.61, p.865.]

This boring mill is of exceptional size and has recently been installed in the plant of the Canadian Westinghouse Co. for handling the large parts of electric generators.

The mill has a total swing of 36 ft. 2 in. and will take work 12 ft. in height. The boring bars have a vertical travel of 8 ft. and the table is 28 ft. in. diameter. The crossrail casting and the



casting for the top bridge are 47 ft. long and 4 ft. deep. The uprights are 23 ft. 3 in. in height and 10 ft. 2 in. in length. The table is driven by a large spur ring gear. A 60-hp., variable-speed, d.c. motor mounted at the rear of the machine furnishes the power for driving.

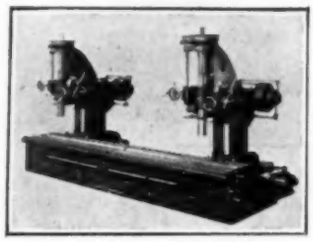
Push-buttons for starting and stopping the machine are located on each saddle and on each side of the mill. The total weight of the machine is 700,000 lb. and the table alone, with its gear and spindle, weighs approximately 208,000 pounds.

— 4 —

Boring Machine, Locomotive-Rod

Colburn Works of the Consolidated Machine Tool Corp. of America, Wilmington, Del. [Vol.61,p.251.]

This machine is adapted not only to boring side rods but, on account of its great range, quick adjustment of heads to any desired position and the large number of speeds and feeds, to any work where two holes are to be bored, drilled, faced, reamed or tapped simultaneously, or where one operation may be performed on the first spindle and another operation on the other spindle. Each spindle



is operated independently. If desired a tapping attachment may be applied to either head and for extremely heavy boring and tapping a tapping hood is recommended.

The specifications of the machine are as follows:

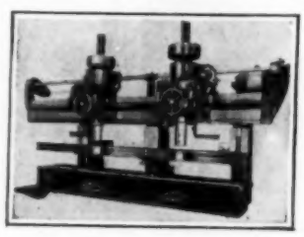
Drilling capacity in steel, 5 in. Boring capacity, 15 in. Swing, 36 in. Working surface of table, 28x173 in. Vertical travel of spindles, 18 in. Maximum distance from spindle nose to table, 30 in. Eight speeds and six feeds for each spindle.

— 5 —

Boring Machine, Locomotive-Rod, Duplex

Newton Machine Tool Works of the Consolidated Machine Tool Corp. of America, Wilmington, Del. [Vol. 61,p.364.]

The spindles of this machine are machined from open-hearth hammered steel forgings and have No. 7 Morse taper holes. Each spindle is independently operated, being driven by a separate motor through back gears and a bronze spiral gear that meshes with a hardened steel pinion. When



the machine is arranged for constant-speed motor drive a six-change gear box, in conjunction with a two-speed spindle head, provides twelve changes of speed. Six changes of feed are available and additional feeds can be obtained by the use of extra pick-off gears. In addition to hand adjustment and power down-feed to the spindles, power quick return is obtained through a metal cone friction. This friction is operated by the same lever that engages the feed. The saddles are 35¼ in. in length and each is independently adjustable. They are securely clamped to the cross rail, taper gibs being provided.

The cross rail has a box section and is bolted and dowelled to three uprights. The uprights are fastened to each end and the center of the bed of the machine. When the machine is equipped with a plain table it has a working surface 24 in. wide and 14 ft. long. All operating parts, with the exception of the drive shaft at the top of the machine and the spindles, are fully inclosed.

— 6 —

Boring Machine, Cylinder, Portable, "Do-Mo"

E. H. Odom Bros. Co., Inc., Atlanta, Ga. [Vol.61,p.41.]

This device is arranged to be attached to the motor while it is in the chassis, is

self-contained on its own base, and does not depend on the old cylinder bore for alignment. The boring bar is carried in a centering head and the tools are double-end cutters made to standard sizes. The boring bar can be withdrawn from the hole without rotating. The feed is automatic and can be engaged at will. The machine may be drvien by hand or by an electric motor.

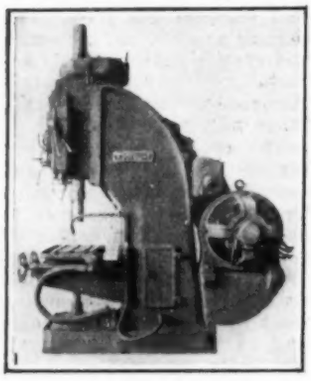
Drilling Machines

— 7 —

Drilling Machine, High-Duty, No. 25½

Foote-Burt Co., Cleveland, Ohio. [Vol.61,p.210.]

This machine has sufficient capacity to drill holes up to 5 in. in diameter in steel. The drilling head is bolted directly to the face of the



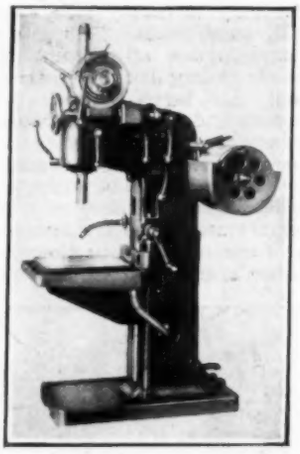
column. All the drive and feed gearing is enclosed in the head and is provided with a pump system for lubrication. The table slides on machined guides on the front of the column and has a vertical adjustment of 18 in. Either a plain or a compound table can be furnished. The center of the spindle is 18 in. from the face of the column, the feeding length is 16 in., and the maximum distance from the spindle nose to the top of the compound table is 30 in. Sliding gears give nine changes of spindle speed, and by changing one set of pick-off gears a series of 18 feeds can be obtained. Steel gears are used throughout. The machine can be furnished for either belt or motor drive.

— 8 —

Drilling Machine, Production, 20-In.

W. F. & John Barnes Co., Rockford, Ill. [Vol.61,p.558.]

A straight-line drive is incorporated in this design and provision is made for the attachment of a direct-connected motor drive. A right-angle drive from either motor or countershaft can also be used, together with a tapping attachment. Eight mechanical changes of spindle speed are available, ranging from 72 to 500 r.p.m. The feed changes number twenty-four and range from 0.010 to 0.231 in. per revolution of the spindle. The spindle is driven through a pair of bevel gears from the main gear train, the spindle driving gear being located directly above the main bearing. Four splines transmit the power of the driving gear to the spindle. The twenty-



four changes of feed are obtained by means of sliding gears and pick-off gears. The machine has sufficient capacity to drive a 1¼-in. high-speed drill in steel. The design provides for the arrangement of machines in gangs up to six spindles.

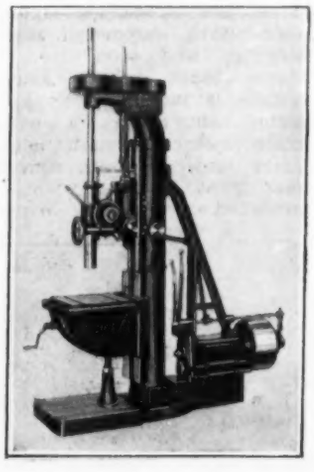
— 9 —

Drilling Machine, Mechanics, 24-In.

Rockford Machine Tool Co., 2410 *Kishwaukee St., Rockford, Ill.* [Vol.61,p.364.]

This machine is of heavy construction and is so designed that all parts are accessible and interchangeable. All bearings are bushed with bronze bushings that are automatically flooded with oil, all moving parts being encased and also flooded with oil. The table is gibbed to vertical ways and is supported by a screw that can be operated to raise or lower the table by means of a crank.

The head is gibbed to



vertical ways on the column and suitable adjustment for wear is provided. The head is a self-contained unit, carrying the feed mechanism. All working parts are enclosed and run in an oil bath. The speed-change gear box is cast integral with the base to afford a rigid support for the gear shafts. Nine changes of speed are available, the gears being controlled by two levers within easy reach of the operator. The feed change gear box is embodied in the sliding head and the feeds are controlled by a sliding key.

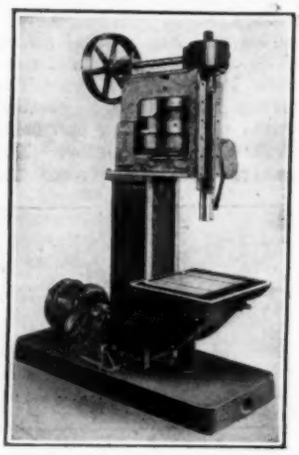
The machine can be furnished for either belt or motor drive.

— 10 —

Drilling and Boring Machine, Cam-Feed

Baker Brothers, Inc., Toledo, Ohio. [Vol.61,p.366.]

This machine is especially adapted for facing work since the cams can be designed to face to the required depth, then providing a long dwell during which the surface is entirely cleaned up. After this the spindle is quickly withdrawn. Intermittent drilling can also be done, the cam automatically giving a rapid advance between the holes that are to be bored or drilled. The maximum distance from the end of the spindle to the table is



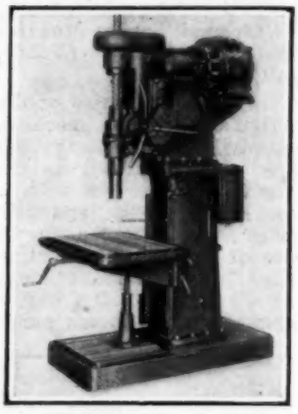
22 in. The size of the plain table is 15x16 in. Each machine is specially equipped to give the feeds and speeds required by the work to be done. One set of cams is furnished as standard equipment.

— 11 —

Drilling and Tapping Machine, No. 210

Barnes Drill Co., 820 *Chestnut St., Rockford, Ill.* [Vol.61,p.712.]

This machine has been developed with the purpose of producing a drilling machine that will be, in effect, a special machine for each job on which it is used, devoid of excess parts and with a direct connection between the motor and the drill. It has a wide range of adaptability but is



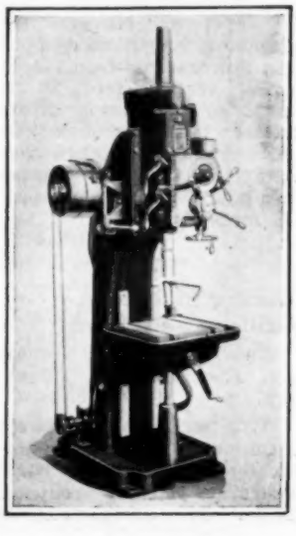
intended for use as a high production machine. Slip gears are provided for any single speed from 100 to 2,000 r.p.m., a sufficient range to accommodate all high-speed drills from ⅜- to 1½-in. at their maximum working speed in any material. Slip gears also provide for a range of feeds from 0.005 to 0.047 in. per rev., and geared thread leading feeds can be provided for tapping operations. All gears are of heat-treated chrome-nickel steel. The table has a finished 17x28-in. surface, surrounded by an oil channel. It is gibbed to the column ways, to which it can be clamped at any height within its 17-in. travel.

— 12 —

Drilling Machines, High-Duty

Foote-Burt Co., Cleveland, Ohio. [Vol.61,p.863.]

This addition to the line of drilling machines manufac-



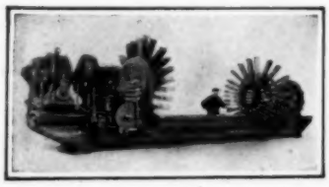
tured by this company includes two high-duty drilling machines, designated No. 23 and No. 24. These machines have sufficient capacity for drilling 1¼- and 2-in. holes, respectively, in solid steel, and are built in manufacturing and gear-box types. The manufacturing type is recommended for use in a single operation when the quantity is large, this type of machine being arranged for one speed and one feed. The gear-box type is furnished for miscellaneous work where different sizes of drills are used. Feed and speed changes are obtained through sliding gears, the gears being operated by means of levers at the front of the machine. The gears can be meshed without stopping the machine. Three feeds, ranging from 0.006 to 0.026 in. per revolution, are available, together with nine speeds in a range from 75 to 610 revolutions per minute. The machines may be driven by belt or motor.

— 13 —

Drilling Machine, Multiple-Spindle, Horizontal, Heavy-Duty

Baush Machine Tool Co., Springfield, Mass. [Vol.61,p. 171.]

This machine is of the double-head type and is adapted for all sorts of heavy drilling. It has capacity for 24 drills 8 in. in diameter in



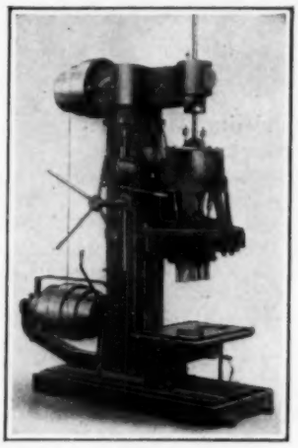
each head. The heads may be either round or square, the round heads ranging up to 36 in. in diameter. Each head can be equipped for fast approach and return, the mechanism being interlocked with the feed so that they cannot be engaged simultaneously. Each head is driven by a 27-hp., variable-speed motor, controlled by a push-button station and a speed variator. The spindle arms allow the centers of holes to be spaced at a distance equal to the diameter of the spindle, and ample adjustment is provided.

— 14 —

Drilling Machine, Multiple, Type A, No. 22

Fox Machine Co., Jackson, Mich. [Vol.61,p.359.]

The feature of this machine is the small number of parts for transmitting the power from the main drive pulley to the drill spindles. The table regularly furnished is of the adjustable, knee



type with a planed top surface 18x24 in. Box tables or rotary tables can be furnished.

The main drive pulley runs on Hyatt roller bearings and the recommended speed is 450 r.p.m. The power is transmitted through an Edgemont single-disk clutch mounted inside the pulley. The vertical feed shaft to the drill head is driven through worm gearing. All feed gearing and shafts are lubricated by means of a splash system.

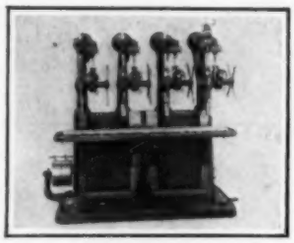
The head gearing for the spindles permits the use of two speeds, so that drills of different diameter can be run at the proper speed. The drilling area covered by the head is 12x18 in. rectangular, or 16 in. round. The vertical travel of the head is 24 in., the maximum distance from the base to the under side of the head being 46½ inches. The drilling spindles run in bronze bushings and are furnished with ball thrust bearings. The adjustment of each spindle to its drilling position is convenient and is accomplished after releasing one nut. Vertical adjustment of the spindles is also possible.

— 15 —

Drilling Machine, Four-Spindle, 20-In.

Superior Machine Tool Co., Kokomo, Ind. [Vol.61,p. 902.]

In this machine the drilling units are mounted on a single base, to the front of which a single table is adjustably mounted. The machine is belt-driven, the power being transmitted to the various heads from a countershaft near the floor at the rear of the machine. Each unit has a foot-operated belt shifter, so that the operator does not have to remove his hands from the work to start or stop the machine spindle. The spindle and the spindle driving and feeding mechanism are the same as used in the standard 20-in. drilling



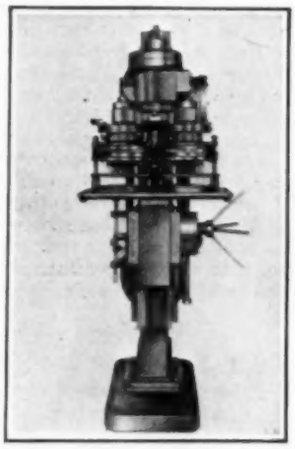
machine manufactured by this company. This machine is adapted for production operations as well as jobbing work.

— 16 —

Drilling Machine, "Multi-Head"

J. F. Buhr Machine Tool Co., 14th and Dalzelle., Detroit, Mich. [Vol.61,p.940.]

This machine was designed for the drilling of stove burners but can be used for other kinds of work.



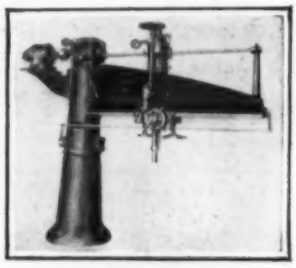
The machine illustrated is equipped with two multiple heads. A single head can be used if desired. Ball bearings are provided throughout, and the machine can be furnished semi or fully automatic, with belt, gear or motor drive. The machine has a flexible feed mechanism through loose change gears, giving feeds from 0.0009 to 0.016 in. per revolution of the spindle.

— 17 —

Drill, Plain, Radial, 6-Ft., No. 100

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. [Vol.61,p.1015.]

Designed for use in boiler, structural and railroad repair shops, this machine is particularly adapted for drilling such parts as tank and boiler plates, beams, columns and other structural shapes. The arm, which does not move vertically, swings 360 deg. in a circle 18 ft. 3 in. in diameter. It revolves in roller bearings and its weight is carried on a ball thrust bearing. The



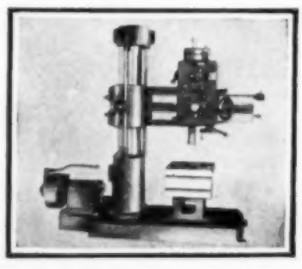
feeds are derived from the spindle so that the feed is automatically proportional to the drill speed. Power feed is engaged by means of a friction clutch of the multiple-disk type. The machine will drill holes in steel up to 2 in. in diameter. The maximum distance from the center of the column to the center of the spindle is 85 in. and the minimum distance is 20 in. The spindle can be moved 20 in. vertically. The maximum distance from the floor to the spindle nose is 55 in. The machine is 11 ft. 5 in. high and the overall dimensions are 3 ft. 3 in. x 12 ft. There are eight spindle speeds and six feeds. A 7½-hp. motor to run at 1,200 r.p.m. is recommended. The approximate net weight of the machine is 7,200 pounds.

— 18 —

Drills, Radial, High-Speed and Heavy Duty

Morris Machine Tool Co., Cincinnati, Ohio. [Vol.61,p. 1017.]

The line of radial drills built by the Morris Machine Tool Company has been rounded out to include 2, 2½ and 3-ft. high-speed and 3 and 3½-ft. heavy duty radials. The high-speed radials have a maximum spindle speed of 900 r.p.m. while that of the heavy-duty machines is 650



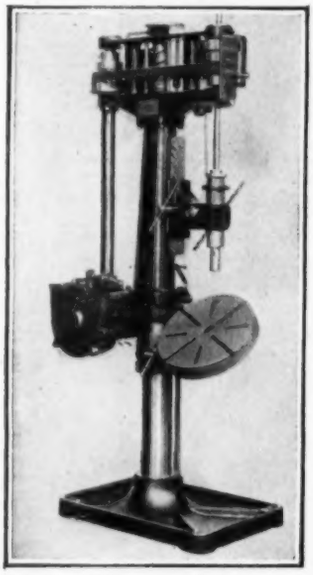
r.p.m. Ball bearings are used for the gears in the speed box and for the helical spindle-gears. Eighteen spindle speeds and six feeds are provided for all sizes.

— 19 —

Drill, Sensitive, High-Speed

Fosdick Machine Tool Co., Cincinnati, Ohio. [Vol.61,p. 212.]

The drive of this machine is through hardened spiral gears running in oil and transmitting power to the upper driving cone by a vertical shaft inclosed in the tube at the back. The direct,



open belt gives four spindle speeds. Shifting of the belt is by the central cam drum controlled by the crank handle in front. The belt is shifted from one step of the cone before it is advanced in the other cone, the belt tension being automatically relieved by an idler cam. After the belt is shifted the tension is again put on the belt by the spring holding the idler. One turn of the crank shifts the belt one step in either direction.

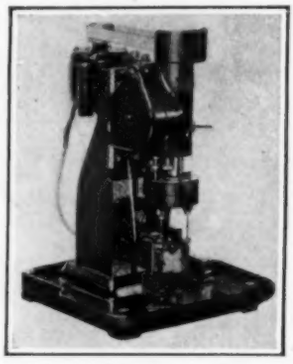
The spindle is of alloy steel, bored for No. 2 Morse taper and accurately ground and balanced. There are 16 ball bearings in all. Spindle speeds vary from 55 to 2,250. The head is dovetailed to the column, which is fitted to the base with a tongue to insure alignment. The table is 16 in. in diameter and is swiveled to tilt 90 deg. each side of center. It can also be revolved around the column. The head has a traverse of 10 in. and the spindle 6 in. The driving belt is 2 in. wide and the single pulley drive should run 1,150 r.p.m.

— 20 —

Drilling Machines, Sensitive, Automatic

Kingsbury Manufacturing Co., Keene, N. H. [Vol.61,p. 634.]

The essential part of these machines is the No. 8 drill head, previously described on page 666, Vol. 57, of the *American Machinist*. The design of the drill head has not been changed as far as



the principle of operation is concerned, but some refinements have been made. The capacity of the head in drilling brass has been increased so that the maximum diameter of drill that can be handled is ⅝ in. This change has been made by furnishing the standard head with a larger spindle, the design of the head mechanism being unchanged. A number of machines are made by this company for automatically drilling small holes, the machines being composed of standard drill heads mounted singly or in multiple, and in positions to suit the requirements of the work to be done.

— 21 —

Drill, Bench, Junior, Improved

Buffalo Forge Co., 490 *Broadway, Buffalo, N. Y.* [Vol.61,p.287.]

This bench drill is provided with a belt drive instead of a gear drive, as formerly.

Power is delivered by a ¼-hp. motor attached to the

base of the machine, through a belt running over idlers. Two speeds are provided and in changing the position of the idlers in changing speeds, no tools are required, as the idler bracket is held by a snap device.

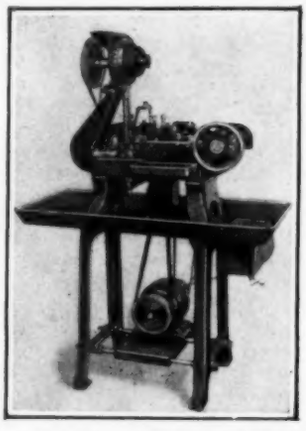
The machine has sufficient capacity for ⅝-inch holes.

— 22 —

Drilling Machine, Rivet, Automatic

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. [Vol.61,p.520.]

This is an automatic machine for drilling out the centers of hollow rivets. The blanks are fed automatically from a drum hopper into a vertical slide, at the bottom of which they are transferred to a device that carries them



to the drill. After drilling they are transferred to an inspection mechanism and are then automatically ejected into a receptacle. The maximum size of rivet that the standard machine will handle is ⅛ in. in diameter and ¾ in. long. The speed of the machine can be changed to suit different materials. The speeds of the camshaft range from 17 to 61 r.p.m.

— 23 —

Drill, Bench, Three-Speed, Improved

Buffalo Forge Co., 490 *Broadway, Buffalo, N. Y.* [Vol.61,p.674.]

The driving mechanism of

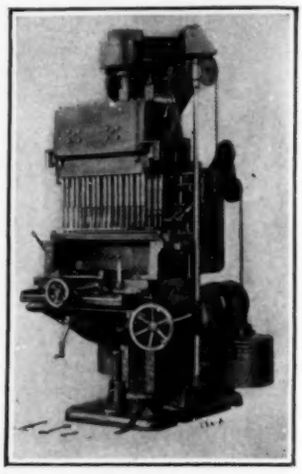
this three-speed bench drill has been improved by eliminating the spur gears that were formerly used between the motor and the first cone pulley. The motor is now directly connected to the lower cone pulley shaft. A belt-driven model of this machine is also marketed.

— 24 —

Drilling Machine, Valve-Hole, Special, No. 10

Defiance Machine Works, Defiance, Ohio. [Vol.61,p. 710.]

This machine is adapted



for boring, reaming, counterboring, and spot-facing the holes in cylinder blocks for the valves and valve stems. The fixed-center head can be made with any number of spindles to suit requirements, and a head can also be furnished with adjustable spindles in a straight line. The maximum over-all dimension of the adjustable arrangement is 30 in. and the minimum distance between spindle centers is 2 in. Both power and hand feed, as well as rapid traverse, are available. The unit type of construction has been used throughout the machine, the head and the feed and speed box being separate units.

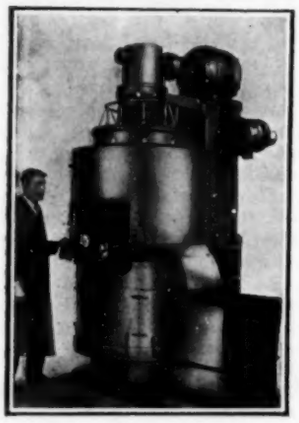
— 25 —

Drilling Machine, Rotary, Continuous

Langelier Manufacturing Co., Arlington, R. I. [Vol.61, p.825.]

This machine is arranged for high-production drilling of small parts. A circular carrier, on which the ten drilling spindles, work tables, and their actuating mechanisms are mounted, revolves around a stationary post fastened to the base of the machine. The drilling spindles are driven through spur

and bevel gearing from a 15-hp. induction motor mounted on the top of the machine. The work tables have round trunions that slide vertically in bearings attached to the



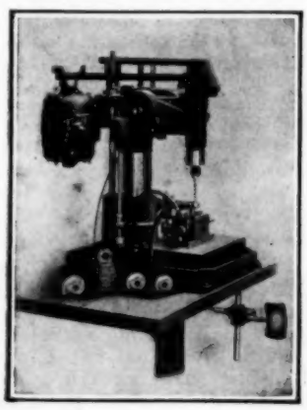
carrier. In operation the work on the tables is fed to the drills, the feed being obtained by means of cam rolls fulcrumed in the lower end of cam blocks and engaging a stationary cam as the carrier revolves. The cam is attached to the edge of the bed under the carrier. At the beginning of the cycle the cam has a pause to permit the loading of the work into the machine. The total feeding rise of the work tables is 2¼ in., of which 1¼ in. is the cutting feed and the remainder gives clearance for inserting the work.

— 26 —

Drilling Machine, Universal, Automatic

Charles Stecher Co., 2452 *North Greenview Ave., Chicago, Ill.*. [Vol.61,p.979.]

This machine is intended for use as a bench drill. The motor, spindle and feeding mechanism are carried in the head at the top of the column, the height of the head being adjustable. Power is delivered by belt from the motor to the spindle, which in turn operates the feed mechanism. Three-step cone



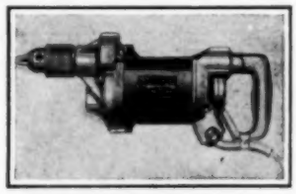
pulleys on spindle and motor provide three variations in speed. The feeds are regulated through a set of change gears, that can be arranged in combinations to provide a desired speed. A cam mechanism, engaged by a knee-operated control under the bench, feeds the spindle automatically, when once set for the desired height and depth of hole. A feature of the machine is the automatic jig-clamping device.

— 27 —

Drill, Electric, Portable, Slate and Marble

Hisey-Wolf Machine Co., Colerain Ave. and Marshall St., Cincinnati, Ohio. [Vol. 61,p.1014.]

To make it suitable for drilling slate, marble and glass, this drill runs idle at 110 r.p.m. It is equipped with a universal motor for



operation on direct or alternating current of the same voltage and of sixty cycles or less per second. It will drill up to ½ in. diameter in slate and marble. Regular voltage is 115 or 230, but other voltages from 32 to 250 will be provided for in special equipment. The weight of the drill is 10 lb. The regular equipment comprises 15 ft. of cable, a plug and a Jacobs drill chuck.

— 28 —

Drill-Stand, Bench, "Ideal"

Neil & Smith Electrical Tool Co., 905 *Broadway, Cincinnati, Ohio.* [Vol.61,p.172.]

This stand accommodates

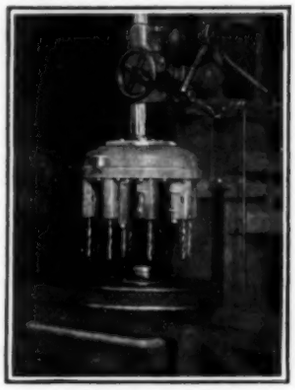
four sizes of the portable electric drills made by the company. No separate adapters are required, and the removal or change of any drill parts is unnecessary when attaching to the stand. Flat spring clamps are drawn up by thumb-screws and hold the drill against suitable V-shaped clamping surfaces. The drill bracket can be moved at will and clamped in position. A spring supports the weight of the drill and the bracket.

— 29 —

Drill Head, Multiple

J. F. Buhr Machine Tool Co., 14*th and Dalzelle, Detroit, Mich.* [Vol.61,p.327.]

This device utilizes spur gears throughout, is equipped



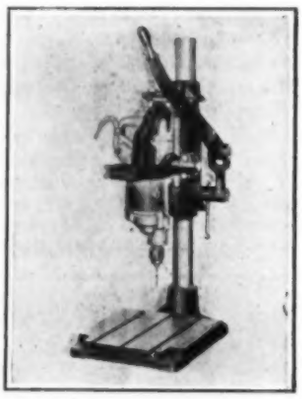
with ball bearings, and is fully adjustable. It is designed for use on any ordinary single-spindle drilling machine. It has a detachable adapter and driver that transmits the power from the machine spindle through a square shaft mounted on a thrust bearing. The thrust capacity of this bearing is sufficient to accommodate the combined thrust of all the drilling spindles in the head. An automatic lubricating system is provided and lubricates all parts of the head. The speed ratios in all types of the head are high enough to suit modern high-speed drills. A multiple tapping head is made by using floating tap holders. Different sized taps may be used in this head at the same time, a tap chuck which makes this procedure possible being furnished separately or embodied in the drill spindles.

— 30 —

Drill Stand, Bench

Hisey-Wolf Machine Co., Colerain Ave. and Marshall St., Cincinnati, Ohio. [Vol. 61,p.327.]

This stand is for use in connection with all types of Hisey ¼- and ⅜-in. hand drills. The essential features of the device will be apparent from the illustration. When the adapter bracket has been



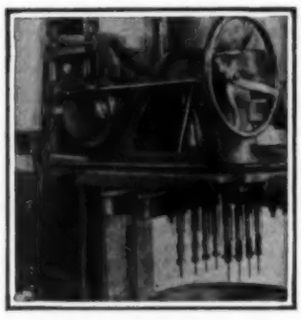
removed this drilling stand can also be used with Hisey portable drills of ⅛-, ¼-, and ⅜-in. capacity.

— 31 —

Reverse, Electrical, Tapping, for Multiple-Spindle Drills

Harrington Co., 17*th and Callowhill, Philadelphia, Pa.* [Vol.61,p.1019.]

Automatic reversal of the directly connected driving motor of the Harrington multiple-spindle drill is obtained by means of this device which does not interfere in any way with the use of power feed for drilling. Adjustable stops mounted on the head of the machine engage a double push button which operates the auto-



matic reversing self-starter and the motor. As it takes approximately two seconds to secure full reversal of the tap, the motor has time to stop and to accelerate in the reverse direction, gradually taking up the back-lash in the gearing and universal joints. The arrangement described was designed to eliminate the destructive shock which obtains when mechanical reversal is used.

The reverse can be supplied for both direct and alternating current motor drive.

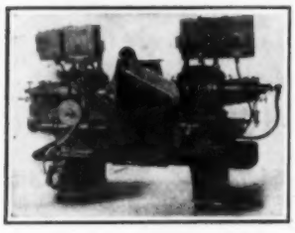
Grinding Machines

— 32 —

Grinding Machine, Thrust Washer

Charles H. Besly & Co., 118 *N. Clinton St., Chicago, Ill.* [Vol.61,p.363.]

This is an automatic machine for grinding the sides of bronze thrust washers. The washers are of cast bronze ⅛ in. thick, 3¼ in. in diameter, and have a 2¼-in.



hole at the center. Both roughing and finishing operations are necessary.

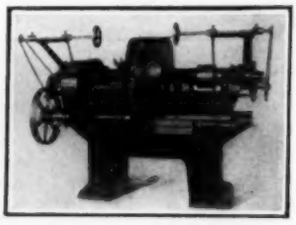
The washers are placed in the inclined chute at the front of the machine and are automatically fed into the holes in the feeding disk. From the loading position the washer is carried down between the guide plates to the underside of the grinding disks and, when the piece is about ½ in. from the edge of the grinding disks, the disks open, allowing the work to enter about two-thirds of its width. As the feeding disk carries the work through the machine, cams at the outer ends of the spindle gradually bring the grinding disks together and both sides of the washer are ground. When the work has reached a point about ½ in. from the outer edge of the grinding disk, the cams release the disks and the finished washer comes out at the top as another blank is being fed in at the bottom. The finished part is automatically ejected from the feeding disk into a chute down which it rolls to a suitable receptacle.

— 33 —

Grinder, Semi-Automatic, for Coil Springs

Charles H. Besly & Co., 118 *N. Clinton St., Chicago, Ill.* [Vol.61,p.401.]

This is a belt-driven, dry-grinding machine, equipped with a semi-automatic feeding mechanism for grinding the ends of coil springs. The springs are fed into the chute by the operator and pass into suitable spaces in the periphery of the feeding wheel. The feeding wheel carries the springs between the two ring-type grinding wheels, the springs being held in the feeding wheel bushings by means of suitable guide plates. The grinding wheels are not separated to allow the work to enter but are locked in the required position to produce springs of the proper length, the only adjustment necessary being for wear. The springs are compressed as they pass between the guides, and the ends of the springs bear against the grinding wheels as soon as they are released from the guides. The position of the heads on the bed



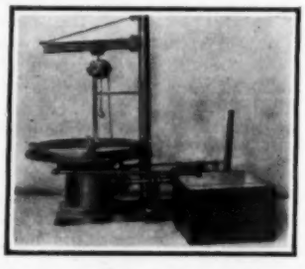
is adjusted by means of a rack and pinion arrangement. The spindles are mounted in phosphor-bronze ring-oiling bearings. The outer end bearings for the spindles have rack teeth that mesh with the pinions controlling the endwise movement of the spindles. The feeding device is driven from a countershaft.

— 34 —

Grinding Machine, Disk, Horizontal, 53-In.

Charles H. Besly & Co., 118 *N. Clinton St., Chicago, Ill.* [Vol.61,p.708.]

The floor plate of this machine carries the main base and an outboard pillow block bearing for the drive shaft.



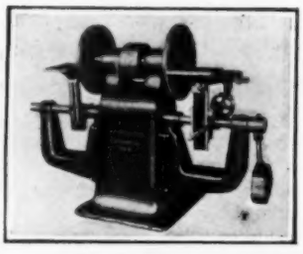
Bevel gearing is used to transmit the power from the drive shaft to the spindle. At the bottom of the cone-shaped housing is a circular partition between the outer edge and the central part of the housing so that there is an opening clear around under the grinding wheel. This is used as a suction chamber for dry grinding and as a receiving drain when wet grinding is being done. When used for wet grinding, a circulating pump, piping, and a three-compartment settling tank are furnished. A jib hoist is attached to the machine for handling heavy pieces of work and removing the disk wheel.

— 35 —

Grinder, Disk, Ball-Bearing, No. 108

Charles H. Besly & Co., 118 *North Clinton St., Chicago, Ill.* [Vol.61,p.858.]

The ball bearings in which the spindle of this machine is mounted are of the double-row radial type and are located close to the edge of the base housing, in order to support the spindle as close as possible to the grinding wheels. Thrust bearings of the self-aligning type are provided and are mounted



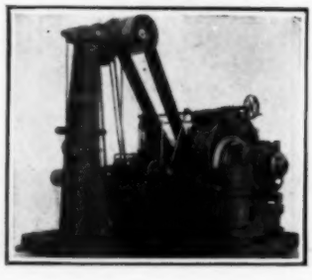
on each side of a circular aligning ring that is rigidly secured in the right-hand housing. The outboard table supports are separate units and are attached to machined pads at the ends of the base casting. The rocker shafts can be oscillated or rigidly clamped in position. The table at the right of the machine is provided with a hand-operated feeding mechanism, in addition to the adjustments necessary to position the table in front of the wheel. The tilting table at the left of the machine has no feeding motion.

— 36 —

Grinder, Automatic, Osterholm, No. 3

Williams, White & Co., Moline, Ill. [Vol.61,p.207.]

This machine is adapted



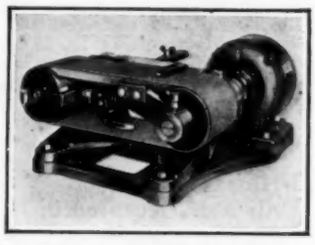
for the finishing of bulky parts with thin section such as gear case covers, etc. The countershaft is supported on columns and the whole outfit is a self-contained unit. The work-carrying spindle housing swings on a vertical axis to the loading position. It is locked in the operating position by a mechanism similar to the breech-block used on large field guns. A single lever starts the automatic cycle of the machine. After the required amount of stock has been removed the feed automatically ceases and the work head stops. The driving mechanism for the work spindle is enclosed and flooded with oil. A cylindrical grinding wheel 20 in. in diameter with a 2-in. rim is used. A 39-hp. motor drives the machine, the grinding wheel running at from 900 to 1,000 r.p.m.

— 37 —

Grinder, Abrasive Band, Motor-Driven

Walls Sales Corp., 96 *Warren St., New York, N. Y.* [Vol.61,p.213.]

This model is known as the "Simplex M" and is similar in its essential features



to the belt-driven model previously described on page 269. Vol. 60, of the *American Machinist*. The incorporation of the motor drive makes the machine portable and self-contained.

The machine is driven by a ¼-hp. motor, furnished for either 110- or 220-volt alternating or direct current. The abrasive bands are 4 in. wide and the table surface is 5 x 10¼ in. The machine is adapted for straight-grain grinding and finishing operations on various materials.

— 38 —

Grinder, Abrasive-Band, No. 2

Coats Machine Tool Co., Inc., 110 *West 40th St., New York, N. Y.* [Vol.61,p.863.]

This additional size of machine is furnished with an adjustable backstop and is used for producing a straight-grain finish on metal and bakelite parts, as well as for finishing wooden patterns.

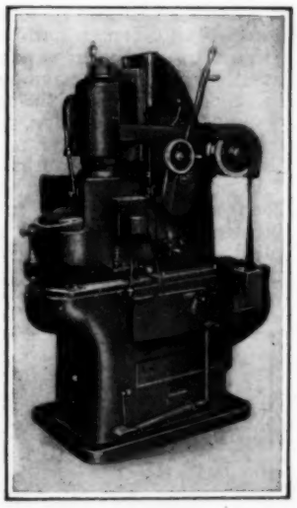
The abrasive band on the machine is 6¼ in. wide and 59 in. long, being kept at the proper tension by an idler pulley. The table is 8 in. wide and 20 in. long. The band is driven by a 6-in. pulley that should run at from 300 to 500 r.p.m.

— 39 —

Grinder, Surface, Rotary, 8-In., Improved

Pratt & Whitney Co., Hartford, Conn. [Vol.61,p. 902.]

Among the improved features of this machine are a longer feed lever, ball bearings on the change-gear shaft, larger passages for the coolant, fine-mesh mag-



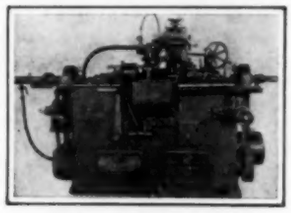
netic chuck with cast-iron water guards, and an improved chuck switch. The former model of this machine was described on page 203, Vol. 55, of the *American Machinist*. The wheel used is of the cupped type and is 8 in. in diameter. Two controls for the feed of the wheel head are provided. For rough-grinding the head may be brought down quickly by means of a suitable hand lever. For fine feeding a suitable mechanism is controlled by a hand wheel and permits accurate setting and feeding of the wheel for close work. The handwheel is graduated to 0.0002 inch. The machine accommodates work up to 10 in. in diameter and 5 in. high.

— 40 —

Grinding Machine, Cylindrical, Automatic

Arter Grinding Machine Co., Worcester, Mass. [Vol. 61,p.709.]

This machine is adapted for the automatic production grinding of small parts not more than 4 in. long by 4 in. in diameter that can be held on centers. This company has taken over the patents,



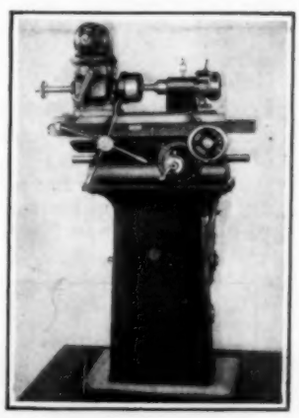
good-will, etc., of the Warren F. Fraser Co., formerly of Westboro, Mass., and the present machine is a modification and development of the original Fraser grinder. Automatic feed is provided by means of a turret in which the work is carried from the loading position to the grinding wheel and thence to the discharging position at the front of the machine. At this point the pieces are pushed into a trough that conveys them to a suitable receptacle or to a stacker, according to the nature of the work. The individual pieces are placed by hand in the turret each time an unloaded work-holder is brought to the upper position by the intermittent indexing movement. As each piece is presented at the grinding position by the turret, the centers move inward in unison and lift the work clear of the holder. Both centers are positively driven.

— 41 —

Grinder, Internal, Motor-Driven, No. 103

Rivett Lathe & Grinder Corp., Brighton District, Boston, Mass. [Vol.61,p.672.]

This redesigned machine



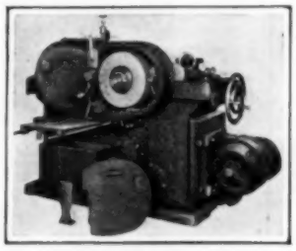
incorporates all the essential features of the original machine, but changes have been made in the work head and wheel spindle. A ¼-hp. constant-speed motor is now mounted directly upon the work head and drives the work-carrying spindle through a train of spur gears and a worm and worm-wheel. A gear shift transmission is interposed in the drive to give two spindle speeds. A friction clutch, operated by a hand lever, allows the spindle to be stopped and started without shutting down the motor. A 3-hp. constant-speed motor mounted at the rear of the machine base drives the wheel spindle, table movements and pump.

— 42 —

Grinding Machine, Centerless, Improved

Heim Grinder Co., Danbury, Conn. [Vol.61,p.939.]

Besides round work of uniform diameter, this machine will grind tapers, shouldered



pieces, irregular contours and parts that do not present a complete circumference; as twist drills that have been fluted and relieved. The base of the machine is of the cabinet type, housing the main shaft from which the grinding-wheel spindle is driven, and also a differential countershaft that is one of the factors in determining the rate of feed. The machine may be driven by either motor or belt. An endless belt within the base drives the grinding wheel at a uniform speed. The differential unit is belt-driven from the first shaft through a pair of cones, and is provided with an internal-gear speed-reduction device. From this unit, the spindle of the second, or "regulating" wheel is driven at a speed that may be varied to suit the nature of the work being done.

The rate of feed may be adjusted from zero to 80 ft. per min., depending upon the speed of the regulating wheel and the angle to which its axis is inclined. Both wheel spindles are carried in slides bearing upon the upper surface of the machine bed and capable of movement horizontally at a right angle to the center line of the wheel spindles. The position of the slides governs the diameter of the work, and the smaller handwheel is graduated to assist in maintaining accuracy in this respect.

The spindle of the regulating wheel may be inclined in a vertical plane to any angle from 0 to 6 degrees.

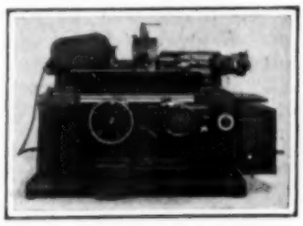
— 43 —

Grinding Machine, Plunge-Cut

Cincinnati Grinder Co., Cincinnati, Ohio. [Vol.61,p. 706.]

This is a wide-wheel, infeed grinding machine with a reciprocating spindle. The grinding is done by feeding directly into the work with a wheel whose face is sufficiently wide to cover the entire surface being ground. The machine is adapted to the grinding of duplicate parts, a number of which can be mounted on a mandrel, as well as for the grinding of single pieces in quantity.

The wheel head base is fixed and the work table is movable, the wheel head being mounted on a slide that is moved across the machine by means of a suitable feed mechanism. The headstock motor is carried in the headstock housing, the main drive motor being placed partially in and carried by the machine base. The wheel slide is held on the platen by its own weight and the pull



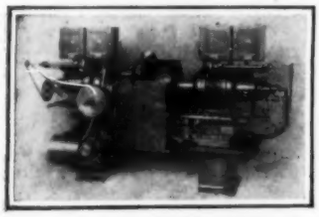
of the belt. The power feed arrangement gives a uniform feed and is driven by an adjustable-speed fractional-horsepower motor. The speed of the motor is controlled by means of a rheostat so that twelve feeds are available, ranging from 0.054 to 0.162 in. per minute in the reduction of the work diameter. The machine is built in four sizes with a swing over the table of 13 in., and distances between centers of 19, 37, 49 and 73 in. respectively. The grinding wheels are all 20 in. in diameter and may be any width from 2 to 7 in.

— 44 —

Grinder, Double-Spindle, Special

Charles H. Besly & Co., 118 N. Clinton St., Chicago, Ill. [Vol.61,p.208.]

This grinder is adapted for grinding the ends of cylindrical valve sleeve parts. The parts are fed to the grinding wheels by a semi-automatic feeding wheel that carries the parts between the wheels. The wheels are mounted on the inner ends of two opposed spindles and



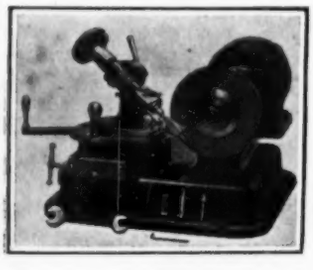
are of the ring type, 18 in. in diameter. Each wheel spindle is driven by a 7½-hp. motor. The finished parts drop out at the bottom into a screen chute. A micrometer adjustment on each wheel spindle is positioned by means of hand-wheels at the front of the machine. A truing device for the wheels is mounted at the back of the machine. The motors are operated by push-button starters. It is said that pieces of the proper size can be ground at the rate of 3,200 per hour.

— 45 —

Drill Pointing Machine, Small, Noyes

Connecticut Cutter & Machine Works, Inc., 50 Remer St., Bridgeport, Conn. [Vol. 61,p.172.]

This small bench machine is for sharpening twist drills from ¼ in. in diameter to No. 60 gage. The wheel is 8 in. in diameter with a ⅝-in. face and is driven by a ¼-hp. motor. The lower slide of the machine can be moved upon the base at right angles to the axis of the wheel and is moved by a screw. A secondary slide moves parallel to the spindle and carries a swinging sector with its center below the grinding point. The upper section of



the sector carries the drill-holding spindle, the spindle being adjustable at any angle in the vertical plane. The drill is held in a spring collet that supports it close to the point. A gage is used to properly locate the drill point in relation to the wheel. The drill point is ground to an arc and adjustments for clearance and other elements of the drill point are available.

— 46 —

Grinder, Tool and Cutter, Universal, No. 99

Wilmarth & Morman Co., Grand Rapids, Mich. [Vol. 61,p.857.]

The general design and characteristics of this machine follow the No. 1 machine made by this company, the main difference being that the recent model is somewhat smaller in work capacity. Both belt- and motor-driven models of the machine are made. The elec-

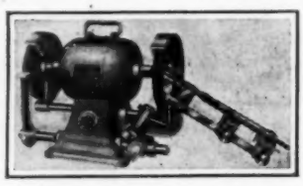
trical controls are mounted on the knee below the table and directly in front of the operator. The various grinding attachments used are interchangeable with the No. 1 machine. The longitudinal movement of the table is 16 in. and work up to 10⅝ in. in diameter by 20 in. long can be mounted on the centers. The vertical and transverse movements of the table are 8 in. and the working surface is 5¼x32 in.

— 47 —

Grinder, Twist Drill

Black & Decker Manufacturing Co., Towson, Md. [Vol.61,p.942.]

This is an electrically-driven bench or pedestal grinder for twist drills. The machine is primarily intended for small machine shops, garages, service stations and the like which generally depend upon "free-hand" methods of grinding twist drills. The twist drill is fed to the cup grinding wheel by means of a microm-



eter screw feed, and no adjustments are necessary for grinding different sizes of straight or taper shank twist drills up to ½ in. in diameter. The equipment includes a general purpose grinding wheel, and a cup wheel.

— 48 —

Equipment for Grinding and Polishing, Type DB-6

R. G. Haskins Co., 516 W. Monroe St., Chicago, Ill. [Vol.61,p.980.]

This machine consists of a heavy pedestal mounted on ball bearing casters with a ½-hp. motor swiveling thereon. The flexible shaft is wound with ¼-in. steel wire.

The equipment operates at a speed of 1,750 r.p.m. While

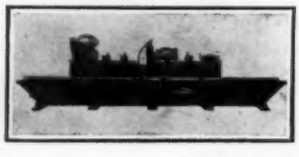
it is shown in the illustration equipped with a soft polishing drum, the machine is equally serviceable for grinding and wire-brush work.

— 49 —

Grinding Machine, Locomotive Piston-Rod

Norton Co., Worcester, Mass. [Vol.61,p.826.]

This machine is for grinding piston rods of locomotives with the pistons in place. It has sufficient capacity to



grind the largest piston rods used on modern locomotives, having a 40-in. swing in the gap and a 16-in. swing over the table. The machine is also suitable for grinding axles, valve rods, and other long cylindrical work within its capacity. The wheel head and mechanism are mounted at the back of the machine. A motor drives the wheel and the wheel head is mounted in large ways so that it can be fed in toward the work. The feeding motion is transmitted to the head by a large screw running in a half-nut that is lapped to fit the screw. The work headstock carries a 2-hp. motor by which the work is revolved on dead centers. This motor is of the variable-speed type, so that the necessary changes in work speed can be easily obtained.

— 50 —

Grinding Machine, Ball-Race, Motor-Driven

Van Norman Machine Tool Co., Springfield, Mass. [Vol. 61,p.557.]

This is an improved model of the Van Norman ball-race grinding machine in which a number of changes have been incorporated, making the machine somewhat heavier than before, as well as adding to the convenience of operation. The main driving belts have been eliminated and independent electric motors applied to all three drives, that is, for the grinding wheel, the work spindle, and

the oscillatory movement of the member that carries the work-head. A treadle is connected to the clutch that disengages the oscillating head from its driving mechanism. The use of the treadle eliminates a hand motion and leaves both hands of the operator free to position the head, load and unload the chuck, and to manipulate gages when necessary. An important feature of the

improved machine is the magnetic chuck for holding the work. This chuck is a product of the Taft-Peirce Co., and was designed especially for this machine.

— 51 —

Grinder, Cylinder and Piston, "Du-All"

Gisholt Machine Co., Madison, Wis. [Vol.61,p.788.]

This is a portable cylinder grinder and piston-fitting machine. It is especially adapted for use in service stations. The machine will grind holes from 2½ to 5¼

in. in diameter, up to 14 in. in length, and pistons or bushings up to 6 in. in diameter and 10 in. long. The machine is a self-contained unit. After the grinder has been placed upon the motor block, as shown in the illustration, it is centered in the bore of the cylinder by a simple centering device. The base of the machine is then clamped to the block. The depth of cut is shown by dials on the feeding mechanism, both power and hand feeds being provided. The grinder head gives two speeds for the wheel. The external grinding attachment for pistons and bushings consists of a crosshead pin that keeps the piece in place on the stepped faceplate, and an external grinding wheel with drive and adjustment.

— 52 —

Grinding Machine, Valve, No. 51

Defiance Machine Works, Defiance, Ohio. [Vol.61,p. 519.]

This machine is furnished with twelve or sixteen spindles and is adapted for use by manufacturers of gasoline engines in the grinding of all the valves in a cylinder block at one operation. A smaller size machine, No. 50, is built with two, four, six or eight spindles. In operating the machine the operator has only to hold the valve head drivers down against a regulated spring tension by pressing lightly against a lever. Provision for doing this automatically may be made in the design of the work holding fixture. The oscillating motion of the spindles, together with the

lifting and returning of the drivers, is automatic.

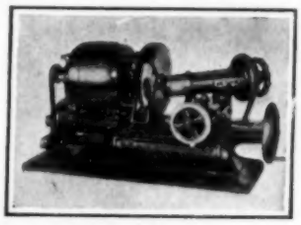
The table for holding the work is gibbed to the base of the machine and is provided with a binding screw. The minimum distance between centers of the spindles is 1⅝ in. and the maximum distance between outside spindles is 30 in. The spindles are located 7 in. from the face of the upright. The working surface of the table is 15 x 32 in. and the vertical adjustment of the table is 12 in. From the nose of the spindles to the table the distance is 25¾ inches.

— 53 —

Grinder, Valve

Fletcher Grinder Co., Lynn, Mass. [Vol.61,p.749.]

This machine is for use in garages and automobile repair shops. One of the features of the machine is the



chuck which is of the draw-in type. The chuck will hold any valve from ¼ to ½ in. in diameter, making it unnecessary to change collets for different sizes of stems. The machine is driven by a General Electric motor, the motor being connected to the chuck by a clutch. The clutch permits the changing of valves without stopping the motor for each valve.

— 54 —

Grinders, High-Speed

Forbes & Meyers, 172 Union St., Worcester, Mass. [Vol.61,p.522.]

These machines are designed to give proper operating speeds for wheels from 2 to 4½ in. in diameter and to maintain these speeds under load. For driving these grinders this company has built true induction motors to run at speeds of 5,400 and 7,200 r.p.m. on

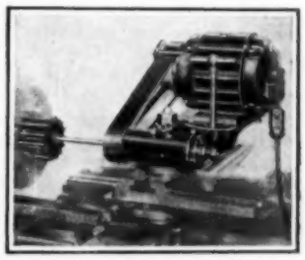
60-cycle current, and at 2,250 and 3,000 r.p.m. on 25-cycle current. The wheels on the grinders are spaced 7 in. from the motor in order to avoid interference, the spindle being supported next to the wheel by a hollow arm. A ¾-hp. motor furnishes all the power that can be used to advantage with the small wheels

— 55 —

Grinding Machine, Portable, Gilbert

Service Tool, Die & Mfg. Co., 2258 Walnut St., Chicago, Ill. [Vol.61,p.826.]

This portable electric grinding machine can be attached to the tool-rest of a lathe, shaper or other machine and is adaptable for either external or internal



grinding. The spindle of the device is driven by a ¼-hp. electric motor through an endless canvas belt. Both the spindle housing and the motor are mounted on a cast semi-steel base that can be attached to the tool-rest of the machine to which it is applied. The external grinding wheel is mounted on the spindle and suitably guarded while for internal grinding a quill is used that slides into the main spindle.

— 56 —

Lapping Machine, "Mirra"

Reed-Prentice Co., Worcester, Mass. [Vol.61,p.170.]

This machine is especially adapted for the lapping of automobile piston pins. A

number of pins are placed loosely on a spider between two lapping wheels that rotate on a vertical axis, the wheels rotating in opposite directions and at different speeds. The action causes the pins to rotate between the wheels and creep slowly in a circular path. The spider is arranged so that the work has three distinct motions in relation to the wheels. First, the creeping of the work caused by the difference in wheel speeds; second, the sliding rotating action caused by the pins not being located radially in the spider; and third, an in-and-out motion caused by the eccentric motion of the spider. The upper wheel slides vertically and is operated by the pilot wheel at the side of the machine.

— 57 —

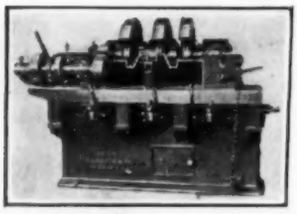
Lapping Machines, Crankshaft

Charles H. Besly & Co., 118 N. Clinton St., Chicago, Ill. [Vol.61,p.517.]

These machines are used in polishing the main and connecting-rod bearings of automotive crankshafts. One of them is designed for lapping the main bearings of a four-throw crankshaft, and another is used for lapping the connecting-rod bearings on the same part. The driving head is mounted on the left-hand end of the work

table and has a driving pulley carried on a friction clutch sleeve. The tailstock is of the quick-acting type, actuated by a compression spring and a cam lever movement that can be operated by either hand or foot.

The saddles carrying the wheels can be moved to the



desired position on the bed by means of screws. The wheel-head slides are mounted on long guides on the saddles and can be moved to and from the work by means of rack and pinion movements at the front of the machine. The wheels are of suitable width to cover all bearings being lapped so that no endwise movement of the wheels is necessary, except in special cases. The wheel spindle speed is 1,150 r.p.m., the work spindle running at 320 r.p.m. Powdered glass or other powdered abrasives may be used, as desired.

— 58 —

Lapping Machine, Flat, No. 33

Bethel-Player Co., Westboro, Mass. [Vol.61,p.633.]

The machine formerly made by this company for lapping flat surfaces, such as the sides of piston-rings, thrust-washers, gage-blocks, etc., and described on page 963, Vol. 58, of the *American Machinist*, has been modified by the introduction of a carrier movement. This arrangement is to cause the work to cover more completely the surfaces of the laps and distribute the wear

more evenly over their surfaces. It is claimed for this device that every part of the lap surface is covered by the work in its passage over them. The work carrier makes several hundred revolutions before beginning to retrace its original path.

— 59 —

Attachment, Lapping or Surfacing

N. A. Strand & Co., 5001-5009 N. Lincoln St., Chicago, Ill. [Vol.61,p.252.]

This attachment is designed for operation through a flexible shaft. It is made in two types, one with a worm-gear drive for comparatively slow speeds, and

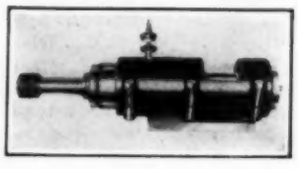
the other with a bevel-gear drive where higher speeds are required. The device is made in several sizes.

— 60 —

Spindle, Grinding, Ball-Bearing, High-Speed

Ex-Cell-O Tool & Manufacturing Co., 1469 East Grand Blvd., Detroit, Mich. [Vol.61,p.597.]

This company has recently added to its line of ball-bearing spindles for various



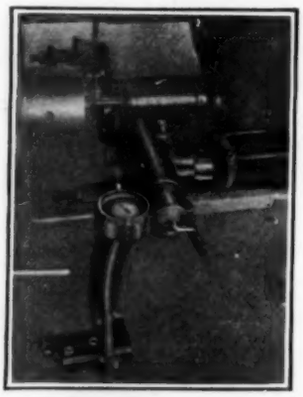
makes of grinding machines, a redesigned type especially adapted for use on Heald internal grinders. The spindle is equipped with three Ex-Cell-O ball bearings. The bearings are mounted in two bodies or housings in the frame casting. The distribution of the belt load over the three bearings is said to have advantages in operation.

— 61 —

Indicator, Sizing, for Bryant Chucking Grinder

Bryant Chucking Grinder Co., Springfield, Vt. [Vol.61, p.671.]

The use of this device enables the operator to know when the exact diameter of hole has been reached without the necessity for constant plug gaging. It is entirely independent, and may be attached to any standard Bryant hole grinder. The device consists primarily of a dial indicator, a diamond gaging point to rest in the bore of the hole being ground, and means for communicating the movement of the gaging point to the dial of the indicator. After the grinding wheel has been



started in a piece of work the device is advanced until the arm enters the hole and the diamond rests against the wall of the hole opposite the wheel. The dial, previously set to the size of hole required, immediately registers the number of thousandths that the hole is smaller than the nominal size.

— 62 —

Grinding Attachment, Cutter, Universal

Davis Boring Tool Co., 3730 Forest Park Blvd., St. Louis, Mo. [Vol.61,p.789.]

This attachment is marketed for regrinding the cutters used in Davis boring tools. The fixture consists of a base, by which it is clamped to the machine table, and an upper section to which the toolholder is attached. The tool is located against two adjustable stops and is held in position by a

clamp with a thumbscrew in the end for obtaining the necessary pressure. The bottom face of the upper scetion is faced on an angle, with the result that the tool is always set at the proper angle to grind clearance accurately.

Lathes

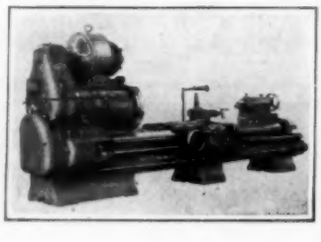
— 63 —

Lathe, Heavy-Duty

Niles-Bement-Pond Co., 111 Broadway, New York, N. Y. [Vol.61,p.33.]

This lathe can be arranged for driving by an a.c. or d.c. motor and is furnished in three sizes, 27-, 30-, and 36-in. The rigidity of the bed is increased by the use of an inclined web between the front and back walls and double-wall crossties spaced every 24 in. When a variable-speed motor is used, four speed changes are given by the head, and for the other drives a total of twelve changes are available. The driving motor is mounted on the head.

The motor is controlled by a handle at the apron and a jog-button control is located



on the head. The spindle speeds are controlled by two levers at the front of the head. All the gears in the machine are of the Maag type. A rapid traverse for the carriage is provided and is actuated by a right and left long-pitch screw in bearings on the back of the bed. The apron is of the double-wall construction and incorporates fine-tooth jaw clutches in the feed train. The quick-change gear box provided 32 changes without the removal of gears, and a total of 48 changes are available. Each size of the machine requires a motor of 15-hp. capacity.

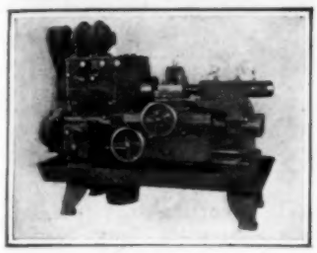
— 64 —

Lathe, Production, No. 2

Reed-Prentice Co., Worcester, Mass. [Vol.61,p.40.]

This machine is designed for heavy-duty service in automotive and general manufacturing shops, and is equipped for straight, taper and form turning, straight and bevel facing, recessing, and straight and form boring. The headstock has four spindle speeds obtained

through sliding gears. The drive is through a disk clutch. All of the headstock gears are of hardened steel and the driving gears to the spindle are of the herring-bone type. Either belt or motor drive can be furnished.



Motors range from 5- to 20-hp. depending on the work.

The carriage is heavy and the bridge is supported by a right-angle bearing under the front tool holder. The apron has independent power feeds. Both the longitudinal and cross feeds are automatically operated and tripped in both directions. The cross-feed handwheel is fitted with a large micrometer dial. Seven different feeds can be obtained. The headstock is lubricated by a splash system. The machine swings 22 in. over the ways and the distance between the centers is 24 in. with a 7-ft. bed.

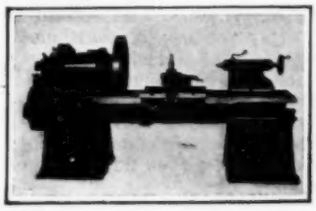
— 65 —

Lathes, Engine

Porter-McLeod Tool Works, Hatfield, Mass. [Vol.61,p. 169.]

This line of engine lathes ranges from 15 to 24 in. in size, and the design of the individual parts has been strengthened to meet the requirements of modern shop work. There are five sizes in the range and all are made with three-step cones and double back gears, giving nine changes of spindle speed. The four larger sizes may be furnished with four-step cones, single back gears and loose change gears, if desired.

There are 1⅝-in. holes through the spindles of the smaller machines, the larger spindles having holes 2¼ in. in diameter. The live center is carried in a removable bushing and all tapers are Morse standard. The aprons are of the double-plate type. The compound slides are ar-



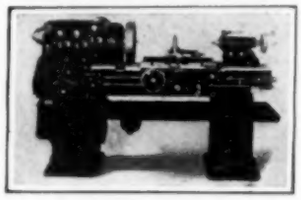
ranged to swing clear around and clamp in any position. All the machines have quick-change gears covering the usual range of commercial pitches.

— 66 —

Lathe, Motor-Driven, Helical-Geared

Monarch Machine Tool Co., Sidney, Ohio. [Vol.61,p.705.]

This lathe is furnished in sizes from 14- to 30-in., all sizes being arranged for motor drive. The salient feature of the machine is the headstock, through which eight spindle speeds are available. The power is transmitted through helical gears that are always in mesh. The speed changes are obtained by three levers at the front



of the machine, these levers operating double jaw clutches in the spindle driving mechanism.

The head is fitted with ball bearings throughout. The auxiliary shafts are mounted in bearings of the combined radial and thrust type and the thrust of the helical gears is taken on ball thrust bearings. Ball thrust bearings also resist the end thrust of the spindle, the main spindle bearings being of bronze.

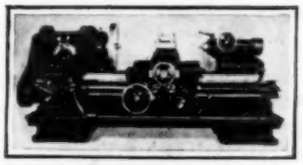
With the motor operating at 1,150 r.p.m., the spindle speeds will range from 13 to 311 r.p.m. The quick-change gear box provides a range of threads from 3 to 46 per in. and a range of feeds from 7½ to 115 per inch.

— 67 —

Lathe, "Super-Production"

Monarch Machine Tool Co., Sidney, Ohio. [Vol.61,p.747.]

This lathe is adapted for heavy turning on work of comparatively small diam-



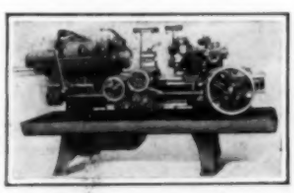
eter and is built in 26- and 30-in. sizes. The machine may be furnished with either cone or geared head, the geared head being recommended for the heavy service for which the other parts of the lathe are designed. Four or eight mechanical speed changes are obtained by means of two levers on the front of the head. These speeds range from 12 to 289 r.p.m., when the driving pulley runs at 150 revolutions per minute. The quick-change gear box provides 32 changes of feed and thread, the threads ranging from 1½ to 23 per in., and the feeds from 7½ to 115 per in.

— 68 —

Lathe, Turret, Hollow Hexagon, No. 1-A

Warner & Swasey Co., Cleveland, Ohio. [Vol.61,p. 551.]

This machine embodies a number of improvements that have been made to secure an increase in power, rigidity and ease of operation. In general type the machine is similar to the turret lathes manufactured by this company for many years. Among the improved features are included an all-steel geared head, an increased number and range of feeds, a quick method of changing the feeds in the aprons of the carriages, a recently developed turret binder mechanism, and betterments in tooling. The double-carriage design is continued and the machine is arranged for the high production of a wide range of work. When the machine is equipped for bar work the collet of the automatic chuck will accommodate round bars 2½ in. in diameter and the maximum turning length is 26 in. When it is arranged for chucking work, it is provided with a 12-in. chuck. The machine arranged in this manner has a maximum swing over the carriage of 13¾ in. and a 16¾-in. swing over the ways. The gears in the head operate in an oil bath and pro-



vide 12 spindle speeds, both forward and reverse. The speeds range from 20 to 477 r.p.m. The standard hollow hexagon turret is furnished, together with the recently developed and patented binding mechanism.

Sixteen changes of feed are available for the turret and the carriage.

— 69 —

Lathe, Turret, Universal No. 4, "All-Geared Head"

Warner & Swasey Co., Cleveland, Ohio. [Vol.61,p. 941.]

This machine is motor driven. The tooling is easily adjusted and the twelve spin-

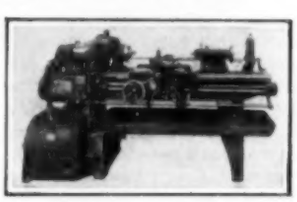
dle speeds provide the proper surface speeds for work of various diameters. Round bars up to 1½-in. diameter can be held in the automatic chuck. For chucking work, a geared scroll-chuck is provided. The maximum swing over the ways is 16 in. and over the cross-slide 8½ inches. More than seventy-five standard small tools can be furnished for the machine from stock. The turret feeds are engaged and disengaged by a friction clutch. Eight changes of feed are obtainable through the gear box. The feeds are automatically tripped by independent, adjustable stops, which operate automatically for each position of the turret.

— 70 —

Lathe, Toolroom, 12-In.

Lodge & Shipley Machine Tool Co., Cincinnati, Ohio. [Vol.61,p.593.]

Among the features of this tool-room lathe are a motor drive in which the mo-



tor is carried on a swinging plate; a belt-shifting device; a "universal" relieving attachment; multiple-plate disk clutches in the apron and headstock; and push-button control. The machine is of the 12-in. size with 3-step cone and double back gears, and swings 14½ in. Eighteen spindle speeds are available. The method of driving the relieving attachment permits hobs with leads as coarse as 4 in. to be relieved. When the attachment is not in use the drive may be directly connected to the regular

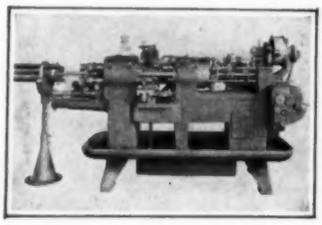
thread gearing and threads as coarse as 4 in. can be chased. The effective range in screw cutting is from 128 threads per inch to a 4-in. lead, and feeds as fine as 0.0025 in. can be obtained.

— 71 —

Screw Machine, Automatic, Multiple-Spindle

Cleveland Automatic Machine Co., Cleveland, Ohio. [Vol.61,p.35.]

This machine has sufficient capacity for ⅞-in. round, 1⅜-in. hexagonal, or ¾-in. square stock. The tool turret is mounted at the center of the



machine, the work-spindle cylinder being located at the left-hand end with the driving pulley and the change gears for spindle speed and tool feed at the right. There are ten feed changes for each spindle speed. The cylinder is indexed by a Geneva movement and locked by a heavy flat wedge. The chuck opening and closing slide is actuated directly from the cam without levers. An independent tool spindle is located at the fourth position and its feed may be accelerated for finish reaming or milling.

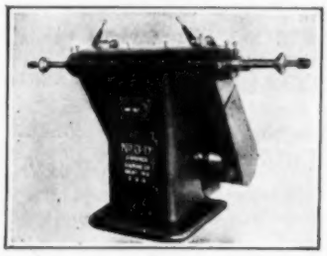
At the third position is a revolving die spindle with two selective threading speeds. The camshaft is located at the rear of the machine and is driven through a worm and wormwheel. The usual cams for the control of the tools and the work are provided. Three cross-slides are provided and a fourth can be fitted as an attachment. Work up to 7 in. in length can be done when the milling stroke does not exceed 3½ in. The maximum milling stroke is 5 in. A 5-hp. motor is required for driving.

— 72 —

Lathe, Polishing, Double-Spindle

Gardner Machine Co., Beloit, Wis. [Vol.61,p.38.]

This machine has two independent spindles in line with each other and they can be run at different speeds. In the motor-driven model the motor is mounted at the back of the machine and drives the spindles through belts, a belt pulley being attached to each end of the armature shaft. The lower halves of the spindle bearing housings are located in the top of the frame of the machine, a separate cap for each housing being provided.



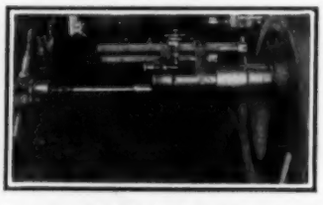
High-grade ball bearings carry the spindles and are located in the housings. A sliding belt shifter is built into the machine. The motor is mounted on a sliding base to take up the stretch of the belts and a 5-hp. motor is recommended. Push-button control for the motor is provided. The only change necessary for the belt-driven model is a rearrangement of the bearing housings to accommodate the overhead belts. The machine may also be driven from a shaft at the rear if desired.

— 73 —

Lathe, Crankpin, Portable, American

C. E. Marsh, 436 Hemphill Ave., Atlanta, Ga. [Vol.61,p. 170.]

This portable machine is for use in turning locomotive crankpins in place on the driving wheels. The body of the machine consists of a spindle attached to the end of the crank pin and a rotating cylinder that carries the tool bars and their feeding mechanism. The flange at the outer end of the spindle is threaded and forms a



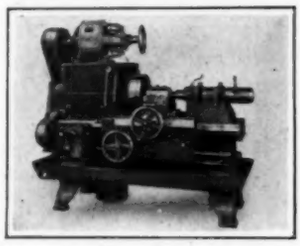
worm for driving the feed mechanism. Two arms on the rotating cylinder carry the boring bars and the outer arm also holds the feed gearing. The feed is automatic and constant and can be stopped or reversed at any point. The tool bars are independent of each other and are interchangeable. Each bar has a separate feed control. The device can be used on crankpins from 3 to 11 in. in diameter.

— 74 —

Lathe, Hollow-Spindle

Reed-Prentice Co., Worcester, Mass. [Vol.61,p.591.]

The spindle construction of this lathe permits the telescoping of work inside the headstock, so that the extended end of the work can be driven close to the cutting point. The machine is especially adapted for the machining of automotive crankshafts, armature shafts,



and similar work in which it is of advantage to reduce the overhang. The headstock is of box construction to accommodate the hollow spindle. The hole in the spindle is large enough to admit all standard makes of automobile crankshafts. A disk clutch and a brake are located in the drive at the back of the head and are used for starting and stopping the spindle. The lathe is entirely automatic in its cycle of operations, including the control of diameters and length of the work. The regular feed box provides four feeds and the compounding of standard gears at the head of the machine gives three additional feeds. The headstock has a splash-feed lubrication system. The apron bearings are lubricated through pipes from an oiler at the top of the carriage.

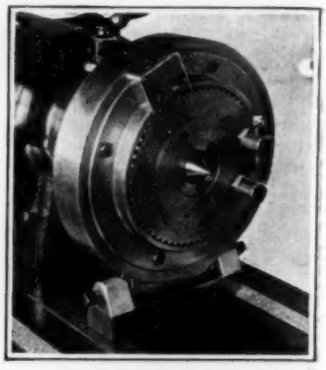
A plain T-slot tool block is regularly furnished, and front and rear blocks of various types can be provided for special work. A patented back arm attachment can be used for facing and chamfering operations.

— 75 —

Faceplate, Speed-Reducing, for Model B Lathes

Pratt & Whitney Co., Hartford, Conn.. [Vol.61,p. 39.]

This device is adapted for use in relieving operations,



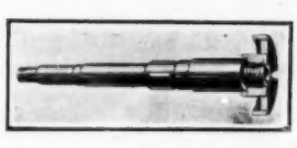
in the cutting of threads with extremely long leads, and as an indexing faceplate. The attachment has a gear that can be fastened to the spindle nose and two planetary gears are carried on a separate plate that is fitted with a driving dog. These gears mesh with the gear on the spindle nose and a large stationary internal gear. The device makes speeds as low as 2 r.p.m. possible. It is stated that threads with leads as long as 12 in. have been cut. The drive plate has 60 notches in its periphery, into any one of which a convenient pawl may be introduced for accurate indexing. This feature is valuable when multiple starts are required, as is usually the case with long-lead screws. The gearing may be locked, if desired, so that there will be no rotation of the drive plate, the device then functioning as a regular indexing faceplate.

— 76 —

Spindle, Hardened

Lehmann Machine Co., Choutou and Grand Aves., St. Louis, Mo. [Vol.61,p. 400.]

This improved hardened spindle has been developed for use on Lehmann geared-head lathes. The part is made of alloy steel. It is properly ground to secure a low coefficient of



friction and is designed to run in hard bronze bearings without danger of grooving. It is driven through four integral keys. The spindle nose provides a hardened bearing for chuck or faceplate on both sides of the thread and a shoulder for the maintenance of correct position. The threads of the plates are a free fit over the outer nose.

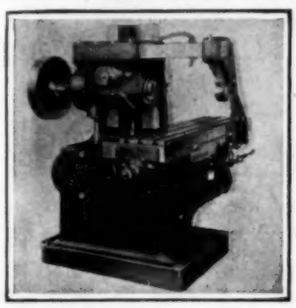
Milling Machines

— 77 —

"Rigidmil"

Rockford Milling Machine Co., Rockford, Ill. [Vol.61,p. 901.]

This simplified, high-production milling machine is of the horizontal type and is designed to handle not only medium-size work, but also work that is usually handled on the larger types of machines. It has the power and rigidity of larger machines but is compactly built with a view to conserving floor



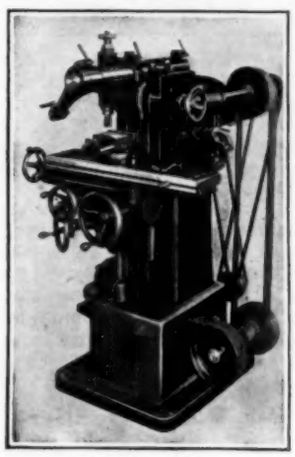
space. Rigidity is obtained by making the knee and saddle integral with the column. The feature of the machine is the spindle head, which is moveable in a vertical direction. This design makes it possible to mill two surfaces at right angles to each other in the same setting, or to lower the spindle close to the work in order to obtain additional rigidity. There are but 15 gears in the entire speed and feed mechanism. Spindle speeds from 17 to 230 r.p.m. are available and the machine can be supplied with single-, double- or triple-thread worms to deliver feeds of from 1 to 7½ in. per min., 2 to 15 in. per min., or 3 to 22½ in. per min., as desired. Feed variations are obtained by the use of pick-off gears. The machine is designed with a fixed-height table, 32 in. from the floor. The maximum height from the table to the center-line of the spindle is 12 in. and the total height of the machine is 56 in. The standard table is 12x43 in. It has an automatic feeding length of 28 in., which can be increased to 42 in. by the use of an extra-length table.

— 78 —

Miller, Duplex, No. 10

Van Norman Machine Tool Co., Springfield, Mass. [Vol. 61,p.403.]

The knee, saddle and table of this machine are the same as in the No. ½ machine. The knee has a vertical adjustment of 16 in. upon the face of the column operated by a screw, bevel-gears and a handwheel. The saddle has a cross movement of 6 in. on the knee. The table surface is 30x6¾ in. and has an automatic feed of 20 inches. The table is provided with a rapid traverse, operated by a large handwheel. The machine



has six feeds in either direction, controlled through shifting gears running in oil and driven by a belt and a pair of 3-step cones. The main spindle is carried on a cross-sliding ram, as in the other types of Van Norman machines, to supplement the cross movement of the saddle. This ram has a transverse movement of 6½ in. and can be clamped tightly in any position. A swivelling head is attachable to the face of the ram, capable of adjustment to any position in the vertical plane. Both the horizontal and the adjustable spindles take standard collets, tightened by means of a draw-bar.

— 79 —

Milling Machine, Bench, Universal, No. 3

Pratt & Whitney Co., Hartford, Conn. [Vol.61,p. 212.]

This universal model of the Pratt & Whitney No. 3 bench milling machine is similar to the regular plain model, previously described on page 573, Vol. 55, of the *American Machinist*. It has, however, many additions and improvements that increase the versatility of the machine. The column, spindle, three-step cone pulley, outboard support and knee are the same as on the former

model, but the plain table has been replaced by one that swivels. The angular range of the swivel is 45 deg. in either direction.

The universal dividing head is a feature of the machine and is similar to those furnished with the larger milling machines. The range of work for which the machine is adapted may be increased by the use of a vertical milling attachment bolted to the face of the machine and driven from the regular spindle. The working surface of the table of the machine is 17½x2¾ in. The traverse of the table is 8¼ in. and the greatest vertical adjustment available is 6¼ inches.

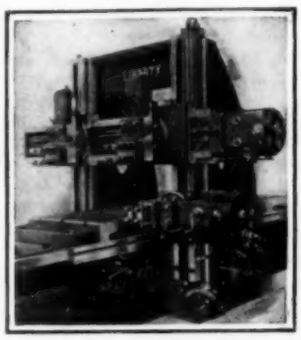
Planers and Shapers

— 80 —

Planer, With Motor-Operated Heads, 36x36-In.

Liberty Machine Tool Co., Hamilton, Ohio. [Vol.61,p. 1013.]

The cross-rail is a self-contained unit carrying all the mechanism necessary for power rapid-traverse of the heads, both vertically and horizontally, and for elevating or lowering the cross-rail itself. The unclamping, elevating, lowering and reclamping of the rail as well as the power rapid-traversing of heads vertically and horizontally are accomplished by the manipulation of one lever. The 1½-hp. motor for rapid-traversing and elevating the rail is built in and is located directly back of the rail.



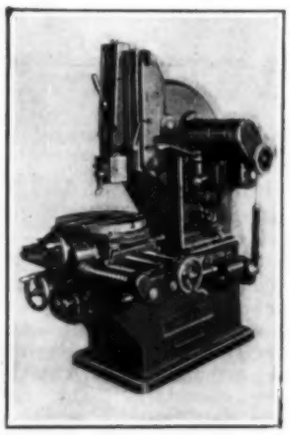
This motor receives its current from protected trolleys. It can be attached to a lamp socket. The screws for elevating and lowering the cross-rail are also used for feeding and power rapid-traversing the side head. The transmission gears are so arranged that by moving the bottom lever the feed takes place at the end of the cut, or before entering the cut.

— 81 —

Shaper, Vertical, Model B, 6-In.

Pratt & Whitney Co., Hartford, Conn. [Vol.61,p. 399]

This machine incorporates improvements and refinements evolved during the time that the company has manufacured this type of



shaper. The machine has been designated the model B, and the basic principle of the vertical design remains unchanged. For driving the machine either a built-in motor drive or a single belt pulley for driving from a lineshaft can be furnished. A friction clutch is embodied in the main drive pulley of the machine and is controlled by a lever located at the right of the ram. This lever controls the operation of the machine at all times and has three positions: a working position, a neutral position and a third position in which a brake is applied to stop the machine quickly. It weighs 4,550 pounds.

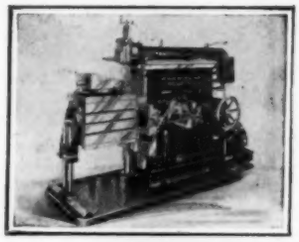
The power is taken into a gear box on the right side of the column. From the gear box power is delivered to the ram through a large slotted eccentric and follower block, this mechanism producing the slow power stroke and the quick return motion. The ram is counterbalanced and the mechanism is enclosed. The ram and its slide form a separate unit on the front of the column. The slide is hinged at the top and has a screw adjustment at the bottom which permits the unit to be swung to any angle up to 5 degrees and securely locked in position. The carriage is mounted on transverse ways on the bed and the rotary table is arranged to slide on longitudinal ways on the carriage. Transverse travel of 14 in. and longitudinal travel of 25 in. are available.

— 82 —

Shaper, 24-In., Improved

Potter & Johnston Machine Co., Pawtucket, R. I. [Vol. 61,p.860.]

The improved features of this machine include an out-



board table support, a pan base, an elevating screw of the telescoping type, and a friction clutch control in the driving mechanism. The machine is adapted for toolroom and repair work. The machine can be driven through a single belt pulley or arranged for motor driving, a 5-hp. motor of the constant-speed type being recommended. The speed changes are obtained through a six-speed quick-change gear box. The length of the ram stroke is 24 in. and the cross traverse is 23 in.

A swivel table is regularly furnished and has an auxiliary tilting side for obtaining compound angles. The table surfaces are 17½ in. long and 15 in. wide. A 16½-in. vertical movement for the table is provided.

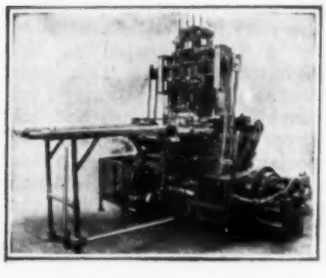
Presses

— 83 —

Press, Blanking and Edging, Combination, No. 403

Max Ams Machine Co., 101 *Park Ave., New York, N. Y.* [Vol.61,p.37.]

This is a double-purpose machine and is designed to accomplish work automatically that formerly required two machines and two or more operators. The machine illustrated is equipped for blanking and forming body sections of tubs and pails, and similar operations on work of a like nature can be performed. The operator has only to place the sheet on the feed table against the back gage and the rest of the action is completely automatic. A 72x27-in. sheet can be handled in the machine.



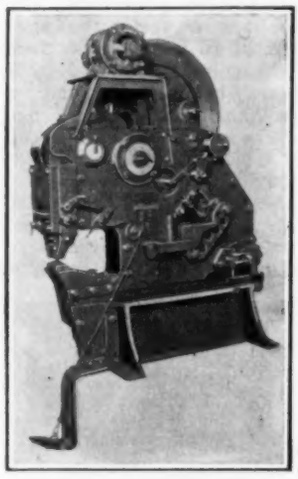
The machine consists of an upright blanking press and an inclined forming press, both receiving their reciprocating motion from the same shaft. The sheet is brought forward at the proper time into the path of the gripper feed and delivered to the blanking die. After the last blank has been cut the remainder of the sheet is ejected at the rear of the machine. The cut blank is pushed through the blanking die to an inclining device that delivers and positions it at the forming die. It is possible to cut within ⅛ in. of the edge of the sheet. The speed is about 35 blanks per minute.

— 84 —

Ironworker, Universal, Junior

Buffalo Forge Co., 490 *Broadway, Buffalo, N. Y.* [Vol.61,p.442.]

This unit has the same slitting, shearing, mitering and bar-cutting capacities as the larger No. 1 machine made by this company, but the framework is more compact and the mechanical design has been changed in some particulars. It is especially adapted for use in the small shop where floor space is somewhat limited.



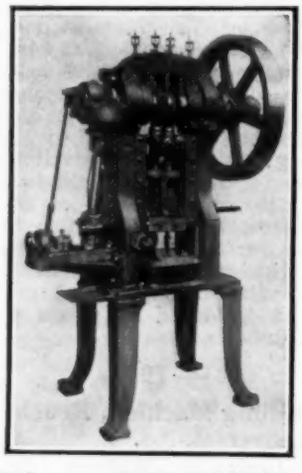
The machine will punch I-beams and channels from 5 to 15 in. in size. The shears will accommodate plates up to ½ in. thick and the bar-cutter will shear rounds up to 1⅝ in. in diameter.

— 85 —

Press, Pillar, Transfer

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. [Vol.61,p.635.]

This press is of the single-acting type with two gates and is intended for multiple operations on sheet stock,



such as piercing, blanking and cupping, or embossing. The press differs from the standard pillar type in having the gate divided into two independent members, each driven from its own crank. The machine is provided with transfer and feeding movements, independently operated through spiral gears and a crank disk from the end of the main shaft. The gates are guided in the frame on the sides and slide on each other in the center.

— 86 —

Press, Punch, Hand-Operated

Union Tool Co., 299 *Norton St., Rochester, N. Y.* [Vol.61,p.708.]

This machine is suitable for small forming, perforating and blanking work. The machine is 13½ in. high

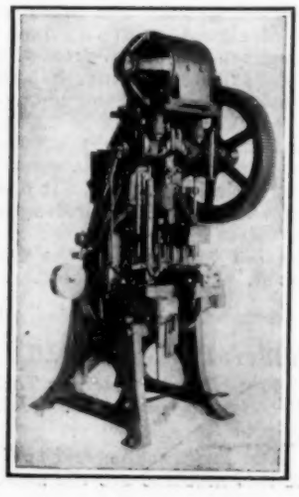
and weighs 46 lb. The maximum die space is 2¼ in. and a 1¼-in. adjustment is provided. It is stated that the machine can be operated faster than a foot press and with practically no hazard to the operator.

— 87 —

Press, Bar-Feed, Automatic

V & O Press Co., Hudson, N. Y. [Vol.61,p.748.]

After the blanking is done on this machine, a series of such operations as forming, drawing, swaging, redrawing, piercing, etc., may follow. The strip of metal is passed to the blanking die by hand or roll-feed. The blank is cut and drops through the die upon a plunger connected with the under-motion. During the upstroke of the slide the bar moves forward and dwells with its first opening over the blank, the bar being



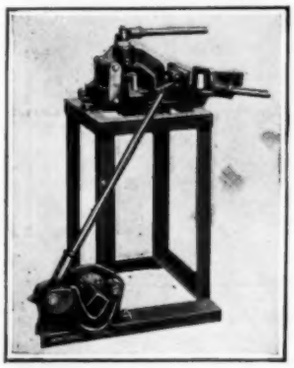
made with a series of openings corresponding in size and shape to the piece in its various stages of formation. During the dwell the undermotion pushes the blank up into the bar and the bar then moves back with the blank and dwells with the blank directly in line with the second-operation punch and die. The downward stroke of the press forces the blank into the forming die and, during the next up-stroke, the second opening of the bar is presented to receive the partially formed part from the second die. The piece is then taken back to the third position, and so on through the series. Since a new blank is cut at each stroke, the entire series of operations is performed simultaneously, and each stroke of the press makes a complete piece.

— 88 —

Notcher, Bender and Shear, Combination, No. 45

Whitney Metal Tool Co., 91 *Forbes St., Rockford, Ill.* [Vol.61,p.857.]

This device is a metal stand on which notching, bending and shearing ma-



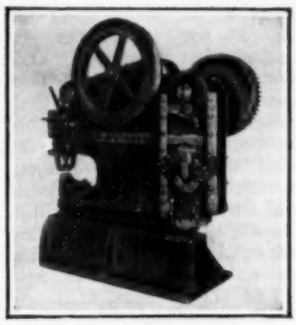
chines made by the company used for angle iron are mounted. The arrangement of the apparatus is shown in the accompanying illustration, the notcher and bender being located on the top of the stand, with the shear mounted on a projection near the floor.

— 89 —

Shear and Punch, Combination, No. 2

Long & Alstatter Co., Hamilton, Ohio. [Vol.61,p. 940.]

This machine is designed to punch holes in plates, angles, structural and other shapes; shear angles, rounds, squares and flats; and split plates. It is not necessary to change tools for any of



the operations mentioned because the punching tools, as well as the various blades, are always set up and ready for use. The punch slide has a lowering device which enables the operator to gage more closely the punch with the work. Blades have four cutting edges, and are made of tool steel of plain shapes for the purpose of lowering the cost of renewal. The changing of blades, when necessary, is easily and quickly done. Sizes with capacity for punching $\frac{3}{4}$-in. round holes through $\frac{3}{4}$-in. material, up to $1\frac{1}{4}$-in. holes through 1-in. material, with the shearing in proportion, are manufactured.

— 90 —

Press, "Superflex," 3-Ton

Fox Machine Co., Jackson, Mich. [Vol.61,p.80.]

This size completes a series of presses with capacities ranging from $\frac{1}{2}$ to 20 tons. As illustrated the press is mounted on legs and fitted with a driving motor. The legs can be omitted making the press a bench machine and the driving pulley can be belted direct to a countershaft. The yielding pressure of the machine is obtained by means of planetary gears controlled by a band brake. The ram has a rack cut on it with which the driving

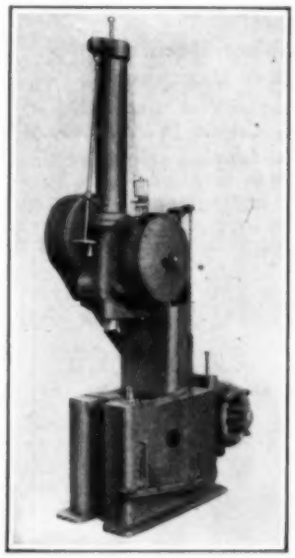
gear meshes. The ram has a quick return motion at twice the speed of the pressing stroke. The down-feed is at the rate of 150 in. per min. The distance between the uprights is $9\frac{1}{2}$ in., 10 in. being the maximum ram stroke.

— 91 —

Press, "Superflex," No. 40

Fox Machine Co., Jackson, Mich. [Vol.61,p.748.]

This machine has a 20-ton capacity and operates on the same principle as the other presses of this line previously described in the *American Machinist*. The height of base is furnished to accommodate the type of fixture used, the column being made longer for a low base so that the under side of the head remains at about the same level. In the design of this press the diameter of the brake drum has



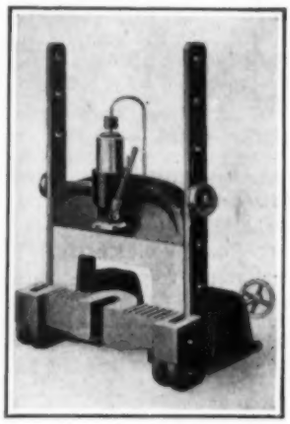
been increased, giving a proportionately more powerful drive with a lighter pressure on the treadle. The friction drum is connected to the planetary gearing in the same manner as the other presses of the line, the drive giving a flexible and yielding pressure that is always under the control of the operator through the pedal.

— 92 —

Press, Vertical-Horizontal

Watson-Stillman Co., 50 *Church St., New York, N. Y.* [Vol.61,p.789.]

This machine has a capacity of 60 tons and combines in one unit a vertical press for forcing, bending, straightening, pressing, etc., together with a horizontal press for all operations ordinarily done on such a press. The press is shown in the accompanying illustration, as arranged for vertical work, and it can be converted into a horizontal press by rotating the handwheel at the side of the machine. In the horizontal position the abutment beam may be moved out a maximum distance of 7 ft. Hydraulic pressure is used only



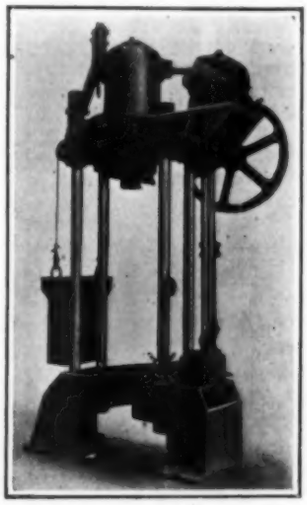
for the high-pressure stroke of the ram, the idle portion of the forward stroke and the return movement being actuated by means of a hand-operated pinion that meshes with a rack in the ram. This rack and pinion device is of sufficient power to make use of the press for light arbor work possible without hydraulic power.

— 93 —

Bushing Press, Hydraulic, Improved

Southwark Foundry & Machine Co., Philadelphia, Pa. [Vol.61,p.213.]

The design of this machine has been recently improved by the application of a triplex pump that speeds up the action of the press con-



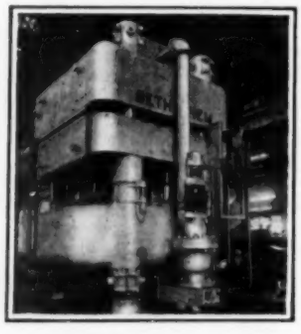
siderably. These presses are built with capacities from 30 to 200 tons. The improved machine is entirely self-contained and requires no hydraulic connections or air piping. The rapid movement of the ram to the work is obtained through the action of the low pressure cylinder of the triplex pump, which rapidly forces a large volume of water into the ram cylinder. The high pressure for doing the work is supplied by two high-pressure cylinders. At the completion of the pressing operation the ram is returned by a counterweight.

— 94 —

Press, Hydraulic, 3,000-Ton

Bethlehem Steel Co., Bethlehem, Pa. [Vol.61,p.828.]

The work for which this large press was designed is exceptionally accurate and, although the working surfaces of the press are 10 ft. wide and 15 ft. long, the



maximum permissible deflection under a full load of 3,000 tons must not exceed 0.010 inch.

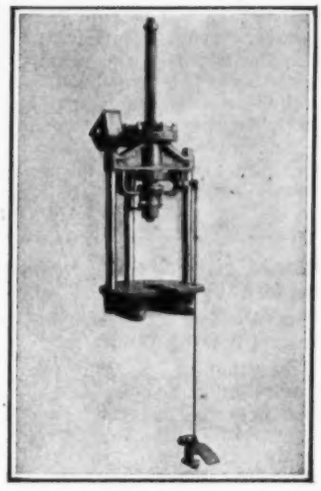
Economy in the use of high-pressure water is provided for by auxiliary lifting cylinders, in combination with a slack water tank on the top of the machine. The pressure water is used in the main cylinder of the press only during the actual working part of the stroke. The machine is supported on lifting nuts, in order to provide a sensitive adjustment in case of any settling of the foundation. Speed of operation is obtained by the use of extra-large pipe connections between the valves and main cylinders of the press.

— 95 —

Press, Arbor, Power, Flexible

General Manufacturing Co., 6442 Farnsworth Ave., Detroit, Mich. [Vol.61,p.210.]

This is a bench model of the equipment made by this company, having a pressure



capacity of three tons and being suited for the general run of arbor press work as well as for straightening, pressing in bushings and other assembly work. The machine is entirely controlled through the treadle and the pressure of the ram can be varied over a wide range. The ram is driven at constant speed through worm gearing. The ram nut carries a brake drum and revolves with the ram until pressure is applied to the treadle, this action stopping the rotation of the nut and causing the ram to descend. The ram is returned by means of a coil spring. The machine will accommodate work 14 in. in diameter between the posts and has an opening of 12 in. between the table and the end of the ram. The ram has a 6-in. stroke.

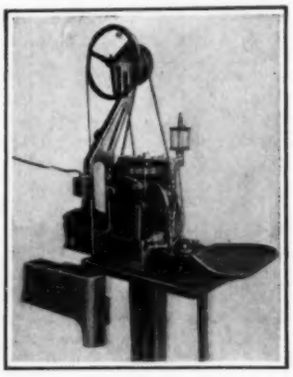
Threading Machines

— 96 —

Tapping Machine, Hart & Hegeman

Purinton & Smith, Hartford, Conn. [Vol.61,p.593.]

The tapping spindle of this machine is driven by a spur gear at the top of the ma-



chine, this gear being in turn driven by a bevel-gear segment. The oscillating movement of the segment is produced by a connecting rod and rock-shaft from a Whitworth crank located on the opposite side of the machine frame. The bearing of the upper part of the spindle is a long bronze nut into which the spindle itself is threaded to give the up-and-down movement without cams or similar devices. The bearing and spindle ordinarily furnished has a 20-pitch thread which adapts the machine for any number of threads between 16 and 24 per inch. A three-step cone for a round belt is provided, giving 45, 65 or 85 cycles per minute. The machine is designed primarily to tap holes up to ¼-in. diameter.

— 97 —

Tapping Machine, Double-Spindle, No. 4A2

W. Gaterman Manufacturing Co., Franklin and 15th Sts., Manitowoc, Wis. [Vol. 61,p.828.]

This machine has sufficient capacity to tap holes from ⅛ to ⅞ in. in diameter. The oscillating mechanism of this line of tapping machines was described on page 496, Vol.

59, of the *American Machinist*, and the single-spindle automatic machine was described on page 151, Vol. 60. The tapping mechanism and spindle control of the double-spindle machine is the same as that on the single-spindle machine. The double-spindle machine is fitted with an automatic rotating jig that is indexed by a small air cylinder. The jig indexes through two stations, so that both spindles work on separate pieces at the same time. If one station in the jig is not loaded by the operator, or if one tap strikes a difficult hole that takes a little more time, either one of the spindles will return and remain stationary until the other has finished its operation.

— 98 —

Tapping Machines, Motor-Driven

Harvey Hubbell, Inc., Bridgeport, Conn. [Vol.61,p. 860.]

These machines have sufficient chuck capacity to handle taps up to ⅜ in. in diameter and are especially adapted for tapping small brass parts.

The mechanism of the machine is mounted on a table at the top of a floor pedestal. The driving motor is carried on a tilting platform and drives the spindle through friction cones. The tilting

of the platform and the pressure between the friction cones is controlled by means of a treadle. The treadle also controls the electric switch and the removal of the foot from the treadle automatically stops the motor.

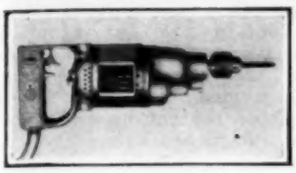
The machine shown in the accompanying illustration is fitted with a plain tapping spindle, but the addition of multiple tapping equipment and a reverse spindle fixture adapts the machine for a variety of work.

— 99 —

Tapper, Electric, No. 2

Black & Decker Manufacturing Co., Towson, Md. [Vol. 61,p.980.]

This machine is similar in design and construction to the other electric drills made by the company except for certain features.



The mechanism in the gear case is so designed that the tap is driven in at a speed of 350 r.p.m. By a slight backward pull on the machine, the tap chuck is automatically reversed and the tap backed out of the threaded hole at a speed of 700 r.p.m. No reversing switch is needed. The machine will tap holes in steel up to ¼ in., in cast iron up to ⅜ in. and in brass or aluminum up to ½ in. It is equipped with a universal motor.

— 100 —

Threading Machine, Two-Spindle, H & G

Eastern Machine Screw Corp., Truman and Barclay Sts., New Haven, Conn. [Vol.61,p.34.]

This threading machine consists of two standard single-spindle machines mounted on a single pedestal. It may be equipped with the spindle and collet type of tailstock when short pieces are to be handled, or with the quick-acting open-side type for long pieces. The single-spindle H & G machine was described on page 1012, Vol. 54, of the *American Machinist*.

— 101 —

Threading Machine

Anderson Die Machine Co., Bridgeport, Conn. [Vol.61,p. 592.]

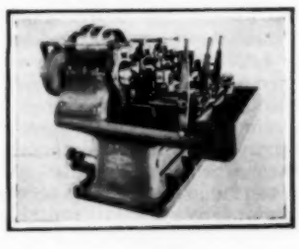
This machine is designed for threading small studs, the stems of oil and grease cups and similar work up to a diameter equal to a ¼-in. pipe thread. The spindle of the machine is driven continuously in one direction by spur gearing that gives 15 turns of the spindle to one of the cycle-operating mechanism. The head is reciprocated by a cam that is keyed to a vertical shaft extending through the center of the column and terminating at the top in the large spur driving gear. In this machine the entire head reciprocates and the spindle is carried in substantial bearings. The head is gibbed to the face of the column and provided with adjustment to compensate for wear. The threading tool is a standard H & G self-opening diehead, arranged to release at the proper point by the movement of a rod. The work is fed to the threading position by means of a dial, operated by a ratchet and pawl movement.

— 102 —

Threader, Bolt-Factory

Landis Machine Co., Inc., Waynesboro, Pa. [Vol.61,p. 211.]

This machine is designed for use in bolt factories or in plants where a large production of bolts is required. In the 1- and 1¼-in. sizes it is made in the double- and triple-head types, a 2-in. size being furnished in the double-head type only. The spindles are located sufficiently near together for one operator to handle a three-head machine without shifting his position. The spindles are independent and are controlled by clutches at the rear of the machine. Any head may be stopped without stopping the machine.



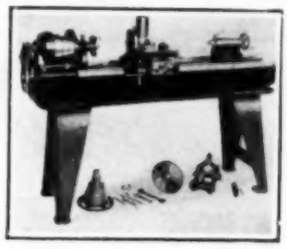
The diehead is opened and closed automatically, the tripping rod which connects the carriage and the diehead yoke being fitted with stop collars for this purpose. The carriage is driven by a rack and segment gear at the center. The levers by which the carriages are operated are adjustable and may be moved to the most convenient side of the machine. The carriage can be furnished with either bolt holders or vise grips.

— 103 —

Lathe, Thread-Cutting, No. 6, Societé Genevoise

R. Y. Ferner Co., Investment Bldg., Washington, D. C. [Vol.61,p.862.]

This is an additional size of the Societé Genevoise thread-cutting lathe, and is adapted for the cutting of precision lead screws for machine tools and other machines. The machine has a maximum distance between centers of 43 in. and the height of the centers is 6 in. The lead screw of the lathe has five threads per in., and sufficient change gears are provided to produce 36 pitches in inch units, ranging from 100 to 4.5 threads per in., as well as 20 metric pitches varying from 0.25 to 5 mm. An accuracy of ± 0.0002 in. in the threaded length of the lead screws produced is guaranteed.



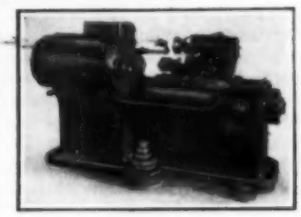
An important feature of the machine is the mechanism for the automatic correction of the lead screw errors and for temperature.

— 104 —

Thread Hobber and Continuous Form Miller, Two-Spindle

Pratt & Whitney Co., Hartford, Conn. [Vol.61,p. 360.]

This machine can be equipped with a ring hob and a suitable lead cam for threading or with a formed or straight milling cutter without a lead cam for circular milling. Two horizontal work spindles are mounted 180 deg. apart in a large drum that is automatically indexed through one-half of a revolution at regular intervals. A cutter head is arranged to slide on ways at the rear of the machine and carries a single cutter that is brought into engagement with the work held in the rear spindle. This spindle is slowly rotated during the milling operation, and for threading operations the cutter head is moved longitudinally by a cam to give the required lead for the thread.



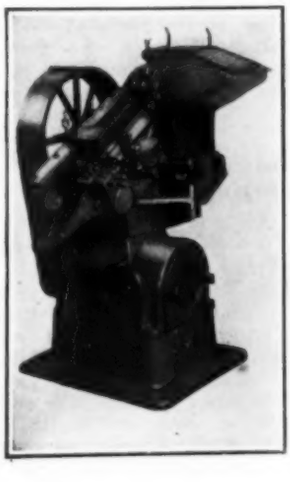
While the work in the rear spindle is being machined the operator removes the finished work from the front spindle and replaces it with an unfinished blank. When indexing takes place the blank is carried into the operating position at the rear and the finished work is brought to the front where it can be removed. In this way, the operation of the machine is automatic except for loading and unloading. Work up to 10 in. in diameter which does not require the use of centers may be chucked and the length available between centers when using the tailstocks is 18 inches.

— 105 —

Rolling Machines, Screw-Thread

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. [Vol.61,p.713.]

Six sizes of this machine are built, having capacities for rolling threads on screw



blanks up to ⅝ in. in diameter. Threaded portions up to 4 in. in length can be produced on these diameters. A hopper feed is provided for the machine, the blanks passing from the hopper down an inclined chute to the transfer mechanism. This mechanism carries the blanks across to the entrance of the dies. The dies are simply rectangular pieces of hardened steel in which the thread grooves are cut. One of the dies is held in a stationary block while the other is fastened to the gate. The blank is pinched between the dies and the thread is rolled on its shank during the downward stroke of the gate.

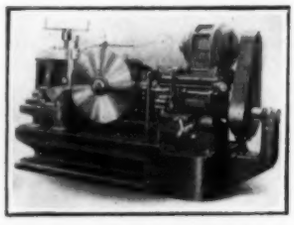
Other Machine Tools

— 106 —

Cold Saw, High-Speed, No. 66

Cochrane-Bly Co., Rochester, N. Y. [Vol.61,p.559.]

As an insurance against vibration and chatter this machine is provided with a saw arbor 5 in. in diameter, hardened and ground and fitted into a solid bearing. The



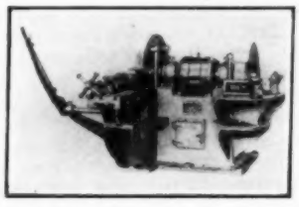
carriage casting fits around the ways and is furnished with full-length taper gibs. There is no bolted joint in the arbor bearing or the carriage bearing on the ways. The machine will handle 10-in. round bars, 9-in. square bars, and 12-in. I-beams. The blade of the saw is 28 in. in diameter and ¼ in. thick. The feeds are geared and positive and the feed screw is mounted in line with the saw arbor. The feeds are obtained through a sliding gear and tumbler, and range from ½ to 2½ in. per minute with 11 changes. An automatic quick return for the carriage is provided. The double-screw vise is standard equipment, but the machine can be furnished with a 60-deg. V-block and three-screw vise for multiple cutting of small round bars.

— 107 —

Hot-Sawing and Burring Machine

Ajax Manufacturing Co., Cleveland, Ohio. [Vol.61,p.864.]

This machine is for use in connection with upsetting forging machines and has been designed primarily for the manufacture of jaw- and T-forgings in which the ends of the bar are split to facilitate the upsetting operation. The machine can also be used to advantage for cutting bar stock to the proper length for forging and for sawing a forging from a bar at the same heat at which it is forged. The burring wheel is used for



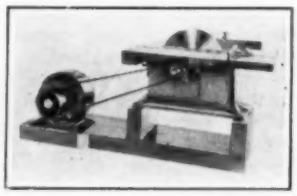
hot-milling flashes or burrs from forgings at the same heat at which the forging is made. It can also be used for milling the fins from butt welds. The machine is built in three sizes. A Westinghouse motor is employed, the armature of the motor being mounted directly on the spindle of the machine.

— 108 —

Saw, Bench

Tobrin Tool Co., Plantsville, Conn. [Vol.61,p.904.]

This device is designed for ripping, cross-cutting and mitering wood up to 2½ in. in thickness. The saw with its driving motor can be



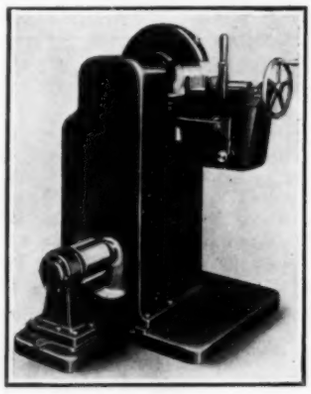
mounted on a wooden stand, as shown in the accompanying illustration, so that it is portable. The saw-table surface is 14x16 in. The table can be elevated for grooving and tilted through an angle of 10 deg. for beveling.

— 109 —

Cutting-Off Machine, High-Speed

Cochrane-Bly Co., Rochester, N. Y. [Vol.61,p.209.]

All shafts and spindles of this machine are mounted in Timken roller bearings in dust-proof cases. The wheels or blades are 16 in. in diameter, and the machine will accommodate an abrasive disk, a toothed saw or a friction disk. The adjustable vise has capacity to hold tubing and other sections up to 4 in. in diameter. The



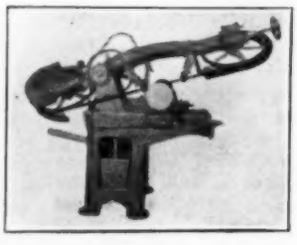
spindle speeds should vary for the different wheels and materials, from 2,500 to 6,500 r.p.m. The machine can be furnished for either belt or motor drive and requires either a 5- or 7½-hp. motor, depending upon the operating speed.

— 110 —

Cutting-Off Machine, Metal, "Milband"

Henry G. Thompson & Son Co., New Haven, Conn. [Vol. 61,p.362.]

This machine is of the bandsaw type and, by reason of a positive feeding



movement, cuts thin-walled tube with the same continuity of movement as solid stock. There are six changes of feed, all controlled by the small crank-lever at the front of the machine.

The main drive is through bevel and miter gears having a reduction ratio of four to one to the lower band-wheel. From the first shaft power is taken off by a chain and sprocket to drive the bank or spur gears which, through a sliding key that is controlled by the feed lever, determine the rate of feed for any given material. A second chain drives a small centrifugal pump that supplies lubricant to the cut from a settling tank within the base of the machine. The band is guided both before and behind the cut by two pairs of hardened steel rollers mounted upon ball bearings. A special blade is used upon all materials and at all speeds. The band is 12 ft. 11 in. long by ¾ in. wide and 0.031 in. thick. The band is guarded upon the idle side and around both wheels by a rigid aluminum guard that protects the operator from injury.

— 111 —

Centering Machine, Hand, Duplex, Improved

Pratt & Whitney Co., Hartford, Conn. [Vol.61,p. 862.]

This is an improved design of the duplex hand centering machine made by this company, the former model of which was described on page 709, Vol. 57, of the *American Machinist*. The addition of an entirely redesigned work-handling device, operated by means of a treadle instead of

by hand, has increased the possibilities of the machine and speeded up the entire action. The work-holding device consists of two work-slides that carry an adjustable V-block and a movable jaw. The jaw is moved by means of the treadle so that the work is securely clamped between the flat surface of the jaw and the groove of the V-block. A spring plunger returns the work-slide to its starting position when the pressure on the treadle is released. The work is loaded into the machine by hand and held in place by means of the treadle.

— 112 —

Gear Generator, Single-Purpose

Lees-Bradner Co., 6100 Carnegie Ave., Cleveland, Ohio. [Vol.61,p.357.]

This gear generator is

termed a single-purpose machine, not because there is any limitation on the number of teeth cut, the thread angle or the diameter of the hob, but on account of the limited class of work that can be handled. The gear blank is fed past the hob as the teeth are being cut, in accordance with the practice of this company. The manner in which the housing completely surrounds the hob and the

work avoids overhang and permits the establishment of an additional bearing for the work slide against the top of the housing. The work spindle has no vertical adjustment and travels only in a longitudinal direction to give the feed and return of the work.

Varying diameters of work are accommodated by a vertical adjustment of the support that carries the hob spindle. Since the machine is designed for cutting spur gears only, it is not necessary for the head to swivel through a large angle. The maximum angular adjustment of the head is 10 degrees and, since there is no occasion for the use of left-hand hobs on this class of work, the adjustment is all on one side of the center. With this arrangement the head will accommodate right-hand hobs of any thread angle up to 10 degrees, including spline hobs and single-, double- or triple-thread hobs of all pitches used for the production of automobile transmission gears.

The spindle is driven through a worm gear similar to those used in the axles of heavy motor trucks. A large bronze wormwheel is mounted on the hob spindle. This gearing is lubricated by a continuous flow of oil from a pump. The machine has two pumps and two lubricating systems, one for oil and one for the coolant.

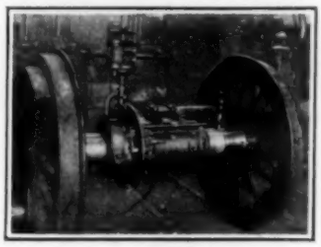
One pair of feed gears and one pair of rotation gears are furnished, and special gears to suit varying conditions can be provided if required for special work.

—113—

Turning Machine, Journal, Portable, Marsh

Chester B. Blakeman, Atlanta, Ga. [Vol.61,p.42.]

This machine is used for turning locomotive axle journals with the wheels mounted. The device is composed of an inner sleeve which is clamped on the center of the axle and an outer sleeve that carries the



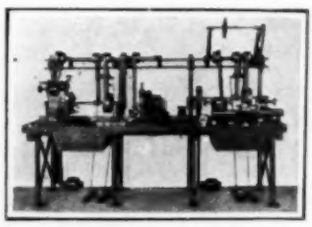
cutting tool and the necessary mechanism for revolving it around the axle. The inner sleeve is bolted to the axle at both ends and is centered by four wedges. The outer sleeve is held by bolts and is driven by an air motor or electric motor through bevel gears. The tool carriage is fed by a screw and suitable gearing, the power being derived from a large worm. The feed is reversible.

—114—

Tool Equipment, Bench, Complete

Pratt & Whitney Co., Hartford, Conn. [Vol.61,p.209.]

This equipment includes a No. 3 universal bench milling machine, a No. 3 bench lathe, a No. 0 Sigourney bench drill, a vise and the various attachments available with



the machines. The tools are mounted on a standard bench and equipped with countershafts and controls. Two ½-hp. motors are placed on the floor and drive the countershafts by belts. The bench has four drawers for hand tools and other equipment. The lathe and the milling machines are controlled by means of treadles and the drill has a suitable belt shifter.

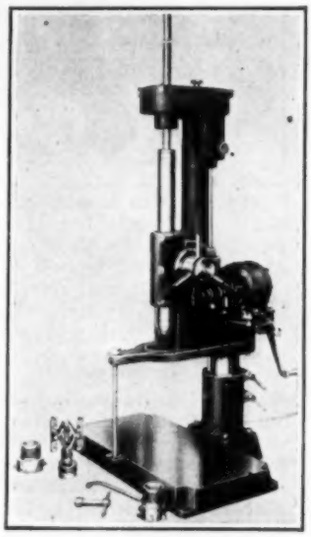
—115—

"Borhonizing" Machine, Cincinnati

John Steptoe Co., Cincinnati, Ohio. [Vol.61,p.251.]

This machine is designed for the reconditioning of worn cylinders from all kinds of motor vehicles. As this is a combined boring and honing machine, it has been given the combination name indicated in the title. The machine is portable, and is equipped with a ½-hp. motor which operates from a light socket.

The machine is designed to handle cylinders from 2⅜ to 6 in. in diameter and 15 in. long, whether single cylinders



or in blocks of 4, 6 or 8 cylinders. The spindle is 1¼ in. in diameter and the machine is equipped with two boring heads, one for small and the other for large cylinders, together with one honing head, with stones, having a large range. The boring heads are self-centering and are designed to leave the bore true and smooth, the hones removing all tool marks.

—116—

Routing Machine

Stark Tool Co., Waltham, Mass. [Vol.61,p.559.]

This is a high-speed, sensitive tool designed to produce the most intricate work. The spindle head is adjustable and is raised and lowered quickly by means of a treadle. The vertical adjustment of the spindle is 1¼ in. The table has two slides located at right angles to each other and operated by feed screws. A 10-in. rotary table fitted with vise jaws is mounted on the upper slide for holding the work. The table is rotated by means of a worm and may be clamped in any position. The position of the table may also be adjusted vertically through a distance of 3¾ in., the greatest distance from the table top to the spindle being 5

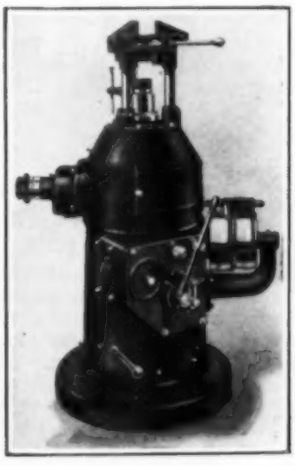
inches. The vise jaws open 7½ in. and the travel of the slides is 7¾ in. From the center of the spindle to the column, the distance is 11 inches.

—117—

Groover, Oil, Continuous

Wicaco Screw & Machine Works, Inc., Philadelphia, Pa. [Vol.61,p.977.]

This machine is designed for cutting various types of oil-grooves, including straight, cross, and right- or left-hand helical oil-groves, on internal and external surfaces of parts. The work-holding chuck is attached to three upright steel posts at the top of the machine. Work up to 4½ in. in diameter may be held in the chuck. Two knurled spring plungers control the movement of the cutter-spindle. By acting on one of them, the cutter-



spindle is operated vertically, without rotating; this arrangement permits the cutting of straight grooves and and keyways and die slotting, as the tool relieves at any point on the circle. The second plunger obliges the cutter-spindle to rotate and reciprocate, according to the type of oil groove that may happen to be required.

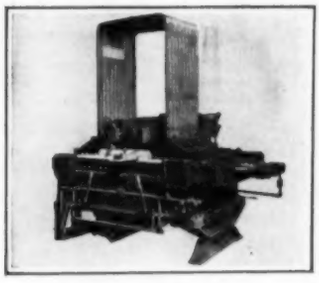
Other Machines

— 118 —

Welder, Butt, Heavy-Duty

Federal Machine & Welder Co., Dana Ave., Warren, Ohio. [Vol.61,p.39.]

This machine is especially designed for welding ribbed steel truck bodies and is illustrated with one of these parts in position. The machine has a 299-kva. trans-



former with sufficient capacity to produce a weld in stock 30 in. wide and ½-in. thick. The transformer is located so that it is protected from the flash of the weld. The movable slide is carried on heavy steel bars extending the full length of the machine, the bearings being placed at the ends so that the effective bearing length is 6 ft.

The machine operates from an accumulator system at from 1,000 to 1,200 lb. per sq. in., the total pressure exerted being 40 tons at the lower pressure. The clamping eccentrics are operated through heavy pinions and racks, the work being clamped with a pressure of 35 tons on each jaw. A continuous stream of water passes through the electrodes during the welding operation.

— 119 —

Spot Welders, Type N

Taylor Welder Co., Warren, Ohio. [Vol.61,p.288.]

These machines are built for heavy continuous duty and to withstand the hard service required for high-production operation. The small size, N-2, will weld material from 30-ga. to two pieces ¼ in. thick. The in-

termediate size is designated N-2½ and is adapted to the welding of ⅜-in. sheets, the capacity of the largest machine, N-3, being sufficient for two ⅝-in. pieces. These machines are built with overhangs varying from 6 to 30 in. The upper horn is adjustable longitudinally in and out. Both horns can also be revolved in either direction to permit welding in corners and similar inaccessible places. In addition, the lower horn is adjustable both vertically and horizontally in either direction. The switch is so designed that it cannot close until the electrodes are properly in contact with the work, and requires no adjustment for the thickness of the work or wear of the electrodes.

— 120 —

Torches, Cutting

Purox Co., 828 Seventeenth St., Denver, Col. [Vol.61,p.634.]

These additional styles of torches are designated E and F, style F being shown with extra tips in the accompanying illustration. The torches operate on oxygen, in combination with acetylene, hydrogen, or other combustible gases, and can be used for welding as well as cutting. The transformation to a welding torch is effected by means of a welding tip adapter that can be furnished

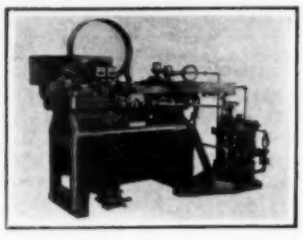
with either torch. The torches are assembled in units so that repairs can be quickly and easily made in the field. The style E torch is 20 in. long and has a cutting capacity of 6 in. The style F torch is 25 in. long and has a 24-in. cutting capacity.

— 121 —

Welder, Rim, Automatic, No. 45

Thomson Electric Welding Co., Lynn, Mass. [Vol.61,p.749.]

This machine is designed for automatically welding rims for automobile wheels. In operating the machine the operator places the rim in the clamp, presses a pedal to open an air valve that closes



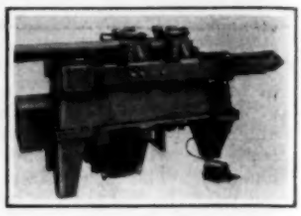
both sides of the clamp and, at the same time, starts the welding. The welder flashes off a predetermined amount, cuts off the current, makes the final push-up, and stops. The operator then depresses the pedal again and the clamps open, releasing the rim. The platen returns to the starting position. The machine can be used on flat, round, or irregular-shaped stock. Special attention has been paid in the design to the prevention of the entrance of particles from the work into the moving parts of the machine.

— 122 —

Welder, Butt, No. 92

Federal Machine & Welder Co., Dana Ave., Warren, Ohio. [Vol.61,p.751.]

This flash-proof butt-welding machine is designed especially for welding locomotive superheater tubes but is adapted for all kinds of tube work. The machine has sufficient capacity for round, standard-gage tubes up to 5⅝ in. in size. The switch is magnetically operated through a remote control system and is mounted on a heavy slate slab in a steel box. Pressure is applied to the welding jaws by means of a hydraulic cylinder with proper dimensions to give a pressure of 3,000 lb. per square inch. In order to



render the transformer immune from the flash of the weld, it is mounted under the movable main platen. Further protection is secured by a slate slab that extends from the under side of the platen nearly to the floor.

— 123 —

Welder, Butt, Automatic, Model 15

Thomson Electric Welding Co., Lynn, Mass. [Vol.61,p.787.]

This machine is shown in the accompanying illustration as arranged for welding pressed-steel pedestals. The machine is equipped with a transformer having a ca-

pacity of 62 kva. and can be operated on the usual commercial a.c. lines. The parts are inserted in the welder and clamped by hand and the operator then trips a short hand lever located on top of the machine. The movement of this lever automatically turns on the current and starts the movement of the platen. The pressure is generated through an Oilgear pump driven either from a lineshaft or a motor, as desired. As soon as the clamps are open the platen travels back to its starting position and is ready for the next welding cycle.

— 124 —

Welder, Butt, Automatic, No. 25

Thomson Electric Welding Co., Lynn, Mass. [Vol.61,p.827.]

This machine is shown in the accompanying illustration operating on steel parts having a cross-section of 0.15 sq.in. The electrical capacity of the machine is 60 kva. The machine will weld iron or steel parts with cross-sections from a minimum of 0.1 sq.in. to a maximum of 0.5 sq.in. The speed of the

machine is only limited by the speed with which the operator can feed the work into the clamps. The manual labor necessary to operate the machine is small, as the clamps are actuated by air pressure and the parts are pressed together by cams. After the work is placed in the clamps, the operator steps on a pedal and the clamps immediately close. As soon as the work is gripped, the machine automatically turns on the current, starts "flashing" and completes the weld. The clamps then open and the platen returns to the starting position. The entire cycle is controlled by a single movement of the pedal.

— 125 —

Carriage, Arc-Welding "Travel," Automatic

General Electric Co., Schenectady, N. Y. [Vol.61, p.942.]

This device is designed to simplify the welding process in production work where similar welds are made repeatedly upon articles of a similar nature. It forms a

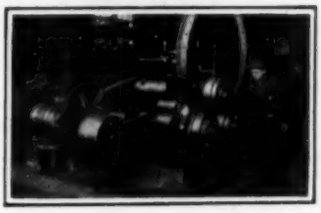
self-contained unit consisting of an automatic welding head, necessary control, travel motor and wire reel support, all mounted on a suitable framework and provided with wheels for rolling along a track. The welding head and control are mounted on the apron of the carriage and feed the electrode wire from a reel to the arc. This reel is carried by supports attached to the carriage frame. The welding head and travel motor are controlled simultaneously and are automatic in their action.

— 126 —

Bending Rolls, Improved

Buffalo Forge Co., 490 Broadway, Buffalo, N. Y. [Vol.61,p.79.]

The principal improvements found in this series of bending rolls are in the redesigned train of rolls, made of high quality steel. These rolls permit the bending of angles singly with the leg



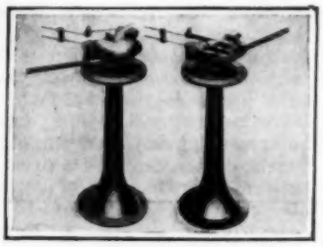
either inside or outside. The springs that formerly supported the top roll have been replaced by a counterweighted lever. An improved spacer arrangement is provided to adjust the space in the rolls to suit the thickness of an angle or tee. An inclined guide roll is fitted on each side to overcome the tendency of the work to bend sideways, but these rolls must be removed when bending tees. All gearing is located above the floor level. Rolls can be furnished for bending copper tubing without first filling the tubing with resin. The machine can be arranged for either belt or motor drive.

— 127 —

Bending Machine, Angle- and Eye-, No. 10

Wallace Supplies Manufacturing Co., 1312 Diversey Parkway, Chicago, Ill. [Vol. 61,p.287.]

The machine at the left is arranged for bending small rods or flats around a forming pin. The forming-pin ar-



rangement is suitable for making a variety of radius bends, including offset or centered eyes, hinge-shaped eyes, hooks, S- and U-shapes, and angle bends with a slight radius in the corner.

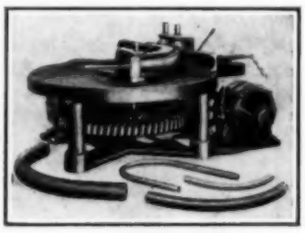
In the other set-up the stationary back die is reversed and the tool holder is fitted with a rectangular die instead of the gripping blade used for bending eyes. A front "angle die" is used in place of the forming pin and is fastened to the table by means of a dowel pin and a capscrew. With this equipment the machine is adapted for making angle bends in flat, round or square stock. Special equipment for bending light flat stock on edge can be furnished. The machine will handle up to $\frac{7}{8}$-in. round or square wire without heating, and $\frac{7}{8}$x1-in. flat stock, or its equivalent.

— 128 —

Bending Machine, Power-Driven, No. 8

Wallace Supplies Manufacturing Co., 1312 Diversey Parkway, Chicago, Ill. [Vol. 61,p.441.]

This machine has sufficient capacity to bend 4-in. pipe



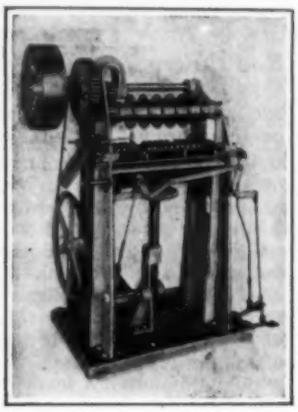
cold, and will also handle reinforcement bars, square and round bars, angles, channels and tees. A number of pieces of pipe conduit and tubing that were bent cold are shown in the illustration. The machine is shown equipped with a form for making a 90-deg. bend in 4-in. pipe, but the pipe can be bent through a greater angle, either by resetting the work in the form and repeating the operations, or by having the machine equipped with a special form to suit the angle of bend desired. Special forms can be furnished for making bends of various angles with radii from 4 to 36 in., depending on the material.

— 129 —

Cutting Machine, Tube, Fretter

Leonard Machine Works, Baltimore Ave. and Hirst St., Lansdowne, Pa. [Vol.61,p. 788.]

In this tube cutting machine, the operation of cutting is performed by bringing the stock into contact with a set of rotary cutters. The cutters are adjustably mounted on a horizontal shaft which is driven through



double back gearing by a pulley. The machine table has a dovetail groove in which are placed a number of tube rests. These may be placed to correspond with the positions of the cutters. The table is raised by means of a cam mounted on a shaft at the bottom of the machine, the cam being rotated through one revolution when a clutch is tripped by a pedal. The cut pieces of tube are pushed out by the entering tube. The machine has sufficient capacity for tubes with an outside diameter of 2½ in. and a wall thickness of $\frac{1}{8}$ in.

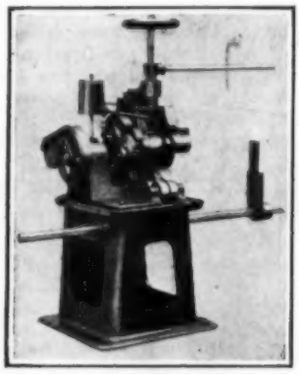
The table height can be adjusted to suit the diameter of the work and the wear of the cutters.

— 130 —

Cutter, Rolling, No. 4

Bignall & Keeler, Edwardsville, Ill. [Vol.61,p.857.]

A length gage has been added to the rolling pipe and tubing cutter which this com-



pany manufactures. The machine with the gage in position is shown in the accompanying illustration, and is designated No. 4. The device has sufficient capacity to cut off pipe or tubing from ⅛ to 4 in. in size and is so arranged that the pipe can be passed under the cutter from either side.

— 131 —

Rod Cutter

Bench Machine Tool Co., 220 North 13th St., Philadelphia, Pa. [Vol.61,p.941.]

This device is for cutting off round rods of any unhardened material from ¼ to ⅝ in. in diameter. It is intended to be permanently mounted on a bench and used instead of a hacksaw or screw machine on this class of work. The device consists of a stationary frame upon which is mounted a lever, the

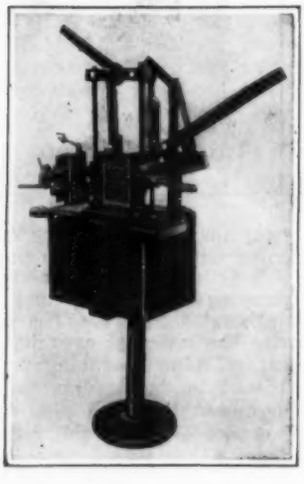
abutting faces of frame and lever carrying hardened alloy steel die plates. Holes of various sizes through the dies allow a rod to be passed through them, the length to be cut off being determined by an adjustable stop.

— 132 —

Die-Casting Machine

R. E. Byrd, 318 Reed St., Erie, Pa. [Vol.61,p.288.]

This machine is especially adapted for use with the soft alloys, such as pewter, white metal, type metal and babbitt. The machine consists of a suitable gas-fired heating compartment for the metal, mounted on a pedestal and carrying the holding and closing mechanism for the



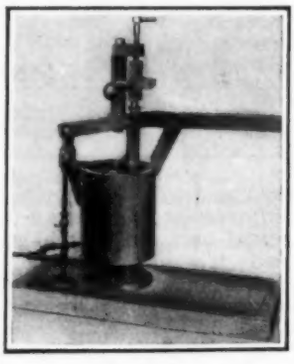
dies above. The dies are carried in a bolster that slides up and down on suitable guide rods and is moved by a toggle lever at the top of the mechanism. When the dies are closed the operation of this lever forces the opening or gate of the die against the opening in the cover plate of the metal pot. The long lever extending at the right of the machine in the illustration is then depressed, thus forcing the metal into the die through the action of a piston in a cylinder.

— 133 —

Die-Casting Machine, Miniature

R. E. Byrd, 318 Reed St., Erie, Pa. [Vol.61,p.520.]

The die in this hand-operated machine is clamped together and then forced against the nozzle of the machine by a screw at the top. When the die is in position the operator depresses the lever, forcing the molten



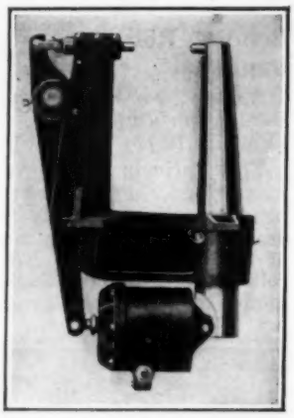
metal up through a hole in the center of the nozzle and into the die. The lever is depressed until the die is full and is then raised to the position shown in the illustration, the die then being removed and the casting ejected. The metal melting pot is 6 in. in diameter and will hold 15 lb. of metal.

— 134 —

Riveter for Light Work

Hanna Engineering Works, 1725 Elston Ave., Chicago, Ill. [Vol.61,p.554.]

This machine will handle ⅝-in. hot or ¼-in. cold rivets. It has a reach of 24 in., with a gap of 13 in. The diameter of the cylinder is 9¼ in. and, with air pressure at 100 lb. per sq. in., will exert a force of 10 tons at the dies. The piston stroke is 7 9/16 in. and the die stroke is 1⅞ in. The total weight of the machine is 1,180 pounds.



Foot brackets are cast on the frame for mounting the riveter in a stationary position with the reach vertical, dies horizontal, and the cylinder at the bottom.

— 135 —

Riveter, Portable, Large

Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill. [Vol.61,p.858.]

This riveter has a reach of 75 in. and a gap of 18 in. It is capable of exerting 150 tons pressure on the dies, using air at 100 lb. per sq. in. in a 22-in. cylinder. A special bail suspension makes it possible to suspend the riveter in either of two posi-

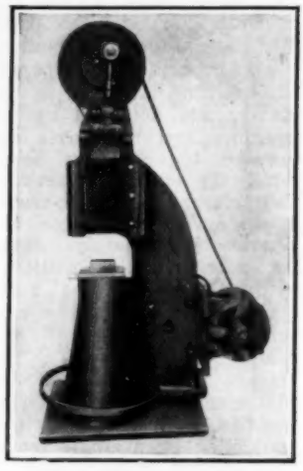
tions or in any intermediate position. Due to the arrangement of the suspension it is easier to raise or lower the die axis by the bail when riveting vertical seams than by raising or lowering the entire machine. The pressing mechanism is the usual Hanna combination of toggles merging into a lever action.

— 136 —

Hammer, Utility

Beaudry Co., Inc., Parkway at Vine St., Everett, Mass. [Vol.61.p.827.]

This is a general-service tool for shops where there is not enough blacksmith work to warrant any large investment in a power hammer. The machine is built in three sizes, in which the weights of the rams are 25, 50 and 100 lb. respectively. The hammer is started, stopped and regulated by means of a treadle extending around the base of the ma-



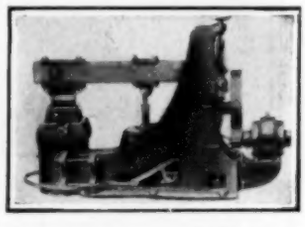
chine. Variation of the pressure on the treadle varies the speed and force of the hammer blow. The strokes vary from 6 in. for the smallest, to 10 in. for the large machine. The number of blows per min. range from 400 to 300.

— 137 —

Hammer, Helve, Air-Cushioned

Beaudry Co., Inc., Everett, Mass. [Vol.61,p.1016.]

The hammer can be operated either by itself or by a motor directly geared to the flywheel. It is claimed to deliver its lightest tap or



heaviest blow at full speed, the first blow being just as heavy as any of the succeeding ones. It comes to rest at top stroke with the helve elevated and dies apart. Air from the compressor cylinder reaches the hammer cylinder through a rotary valve which regulates the amount of air and controls the blow. The power plant is separate from the main frame and is readily removable. The hammer helve is adjustable for

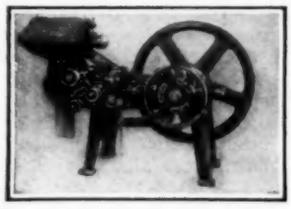
varying thickness of stock. The hammer is built in four sizes from 40 to 200 lb. in weight.

— 138 —

Trimming Machine, Bolt Head

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. [Vol.61,p.711.]

This machine is used for trimming the heads of cold-headed bolts and screws to square, hexagonal, or other shapes. The machine is built in three sizes with capacities for blanks up to ⅝ in. in diameter and from ⅝ to 8 in. in length under the head. Blanks up to 4 in. in length are fed automatically from a hopper into a chute and thence to the device that transfers them to the trimming tools. Longer blanks are placed in the chute by hand. The blanks are picked



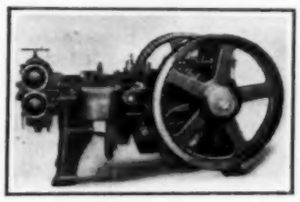
from the side of the chute by a pair of spring carrier fingers attached to an oscillating shaft. The shaft is mounted in a cross-slide and, when the fingers are swung up to the chute angle, the slide advances toward the chute causing the fingers to snap over the blank. The slide then recedes with the blank in the fingers and the fingers swing downward. The slide again advances until the blank is on the center line of the tools, where it is held until encompassed by the tools that perform the trimming. The two smaller sizes of the machine are direct-driven, the largest size being back-geared. The production rates of the machines are 65, 50, and 35 blanks per min., respectively, and they require 5, 7½ and 10 hp. for driving.

—139—

Headers, Crank, Double-Stroke

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. [Vol.61,p.556.]

In the solid-die type of these machines the wire is headed while located in a recess or hole in a solid piece of hardened steel, this machine being used for comparatively short work that may require accuracy in diameter and high-quality finish. Two rectangular dies with mating semi-circular grooves are used in the open-die type of machine, the two members being held together under heavy pressure while the heading is being done. This machine is adapted for longer work than the other type, or for a class of work on which the parting line produced by the split dies is not objectionable. The machines use two strokes to form the head on the wire and two punches are provided, one to cone the end of the wire and the other to finish the forming of the head. The machines are



built in five sizes in each style, giving a complete range of wire diameter from $\frac{1}{16}$ to ⅝ in. It is stated that the production on the open-die headers ranges from 140 blanks per min. for the smallest to 75 blanks per min. for the largest machine, the production on the solid-die type varying from 125 to 55 blanks per min., according to size.

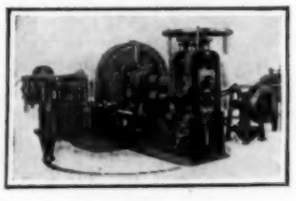
Sturdy construction results in net weights ranging from 3,600 to 32,800 pounds.

— 140 —

Flattening Mill, Wire, Improved

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. [Vol.61,p.750.]

This type of machine is used to make rectangular nut stock from hot-rolled wire by the cold-rolling process. Two pairs of rolls work at the same time, one pair for flattening the wire and another for squaring the sides. The latter are called edging rolls and are mounted in an auxiliary attachment that can, as shown in the illustration, be swung away from the mill proper on a track when not in use. The smaller sizes, up to ½x½ in., can be produced in three passes through the flattening rolls.



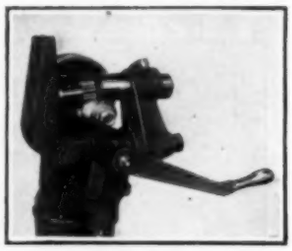
On larger sizes four passes are necessary. It is stated that this equipment will produce nut stock to within 0.002 in. of the basic size.

— 141 —

Gear-Burring Machine

Dynamic Gear-Burring Machine Co., 14031 *Westlawn Blvd., Detroit, Mich.* [Vol. 61,p.328.]

This machine is designed to remove the burrs that are



raised on the ends of gear teeth in the cutting or hobbing operation. The operation is performed by means of a burnishing tool and a shearing tool, the burnisher being so located that it will mesh with the gear and resembling a hob in which the teeth have not been gashed. As it turns, it revolves the gear which is carried on a suitable arbor. The burnisher "irons" the burrs out so that they will project from the ends of the teeth at the desired angle and, as the gear revolves, the burrs are sheared off by the stationary cutting tool. The machine will handle spur, helical or bevel gears, with some exceptions, and sprockets up to 8 in. in diameter and with a 3-in. face, and takes 4 sq.ft. of floor space.

— 142 —

Engraving Machine

Branch Tool Co., Forestdale, R. I. [Vol.61,p.1014.]

The machine will engrave soft steel, brass, aluminum, hard rubber, Formica or

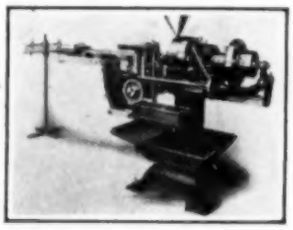
Bakelite up to ¼ in. in thickness, of any width and up to 14 in. in height. A 4x10-in. table is arranged to hold brass master letters, furnished with the machine, in one, two or three lines. When these master letters are traced with the stylo, the cutter reproduces them on the panel about one-third the size of the masters. The only adjustment needed is for the depth of the engraving desired. The equipment comprises one hundred master letters, numerals and various symbols. The base of the machine is 8¼x14¼ in. and the motor supplied can be used on 110 volt current, a.c. or d.c., any phase, from 25 to 70 cycles.

— 143 —

Swaging Machine

Torrington, Co., Torrington, Conn. [Vol.61,p.328.]

This machine is especially designed for use by manufacturers of optical goods, being particularly adapted for swaging spectacle bows and frames. The wire is fed from a coil through a roll straightener and the operation of swaging and cutting off the swaged pieces to length is entirely automatic. An adjustment for controlling the reduction is provided. Oil may be de-



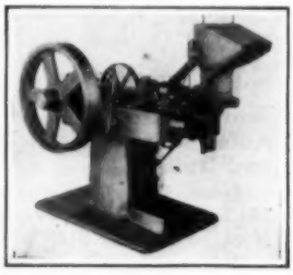
livered to the swaging head from a rotary pump or allowed to drip on the work from a pipe connected to a small tank on the head of the machine. The weight is approximately 1,200 pounds.

— 144 —

Pointing Machine, Pinch

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. [Vol.61,p.861.]

This is a machine for automatically producing conical points on wood screw and drive screw blanks, "pyramid" points on escutcheon pins, wire nails, etc. The



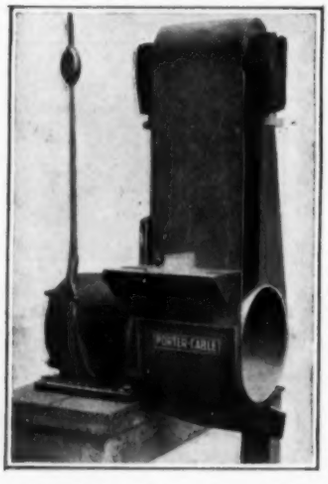
machine is provided with a hopper feed and chute which delivers the headed blanks into a notched dial in an index head. Suitable adjustments enable the accommodation of blanks up to 2½ in. long under the head and with a maximum diameter of ½ inch. As soon as the dial has brought the blank into line with the dies, the die in the gate advances, partly displaces the blank from the dial, and pinches its end against the stationary die attached to the bed. The dies are simply rectangular pieces of hardened steel suitably formed to pinch the wire and fastened in steel die-holders by clamp screws.

— 145 —

Sander and Grinder, Belt, 6-in.

Porter-Cable Machine Co., 1708 *N. Salina St., Syracuse, N. Y.* [Vol.61,p.37.]

The grinding bed of this machine is 6x18 in. and the entire device is small enough to be portable. The grinding bed may be placed in a



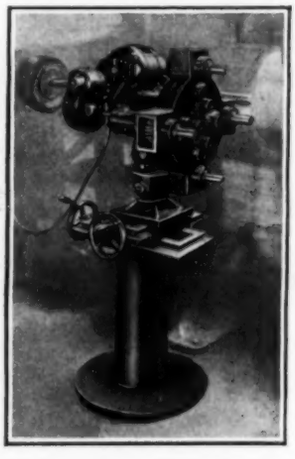
vertical position as illustrated or in a horizontal position if desired. The belt is driven by a ½-hp. motor. Belts of various kinds may be used so that the machine is adapted for doing work on wood, metal, horn, bone and other materials. The table is equipped with an angle gage that may be removed. The motor runs at 1,725 r.p.m., giving a belt speed of about 3,300 ft. per minute.

—146 —

Work Holder, Semi-Automatic, for Polishing and Buffing

Acme Manufacturing Co., 1645 *Howard St., Detroit, Mich.* [Vol.61,p.404.]

This machine is for holding work while it is being polished or buffed, and automatically presents the work to the wheel and revolves it while the operation is in process. The machine is intended for use where standard parts are produced in large quantities. The operating part of the machine consists primarily of a head carrying four spindles. The work is held by expansion chucks that are designed to suit and attached to the spindles. The head indexes automatically at given in-



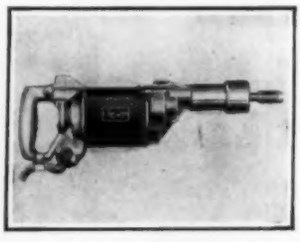
tervals and, as each piece is presented to the wheel of the polishing machine, the spindle on which it is located starts to revolve and continues to revolve until the work has left the wheel.

— 147 —

Screwdriver, Electric, Friction-Head

Hisey-Wolf Machine Co., Cincinnati, Ohio. [Vol.61,p. 673.]

This friction-head electric screwdriver has sufficient capacity to drive No. 14 screws, 2½ in. long, in solid soft wood. The machine can also be used for setting nuts, for which sockets in ¼-, ⅜-, and ½-in. sizes can be furnished for square and hex nuts.



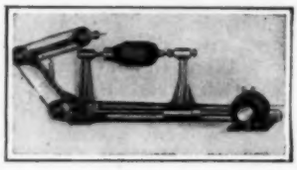
The driving head is equipped with a disk friction clutch that is automatically regulated by the pressure applied. The clutch casing is of convenient size and can be used as an end grip when the work requires it.

— 148 —

Undercutter, Mica

Ransom & Randolph Co., Toledo, Ohio. [Vol.61,p.712.]

This machine is for undercutting mica insulation in the commutators of small armatures. The device is quickly adjustable to accommodate any type of small armature up to 22 in. in length and 11¾ in. in diameter. The armature is



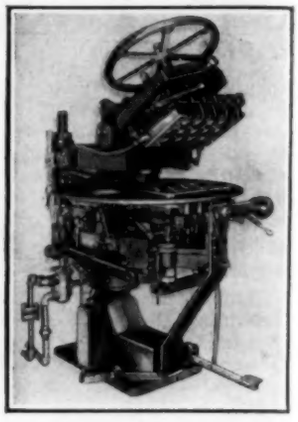
held between centers so that it may be rotated by the operator's left hand, while the right hand is used to move the cutter. The cutter spindle is mounted at the end of a swinging arm, and is driven through belts from a motor mounted at the other end of the machine.

— 149 —

Molding Machine, Plastic, "Duo-Press"

Automatic Molding Press Co., 280 *Passaic St., Newark, N. J.* [Vol.61,p.366.]

This machine is designed to mold articles out of shellac, bakelite, celluloid or other plastic combinations. The



mechanism of the machine and the arrangement of the parts make possible a great variety of combinations of temperature, pressure and time, so that the device is universal in its scope. A main pressing unit is mounted in combination with a sub-press for all preheating and prepressing. A mold gripping and separating press is also incorporated, together with a tilting-head mechanism for exposing the molds. The machine has an automatic turntable for handling the molds. The main press has a capacity of 127 tons and is kept in constant action, since the separating, loading and unloading of one set of molds is done while a second set is under final pressure and curing.

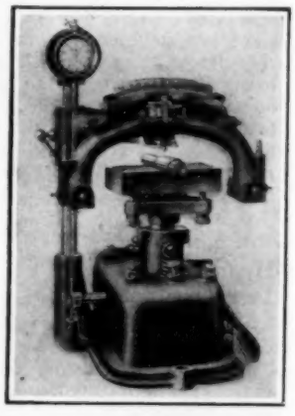
Measuring, Gaging and Testing Equipment

— 150 —

Stand, Operating, Pendulum, Herbert

Tinius Olsen Testing Machine Co., 500 *N. Twelfth St., Philadelphia, Pa.* [Vol.61,p. 521.]

This stand is especially adapted for inspection testing in which a large number of tests must be made rapidly, and also enables the making of "time tests" without previous practice. The pendulum hardness tester and its operation were described on page 817, Vol. 58, of the *American Machinist*. The device is operated by means of a single handle. First the table is released and allowed to rise until the pendulum swings gently on the work. The stop watch is operated by a slight movement of the same handle and, at the end of the test, the table is lowered and the pendulum is replaced. The arm supporting the pendu-



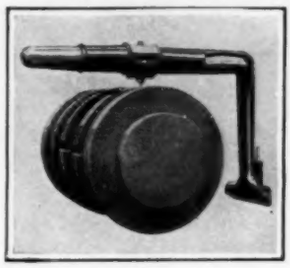
lum can be raised to admit specimens up to 6 in. thick. The table is mounted on a plate, resting on three screws and can be replaced with fixtures for irregular work.

— 151 —

Hardness Tester, Pendulum, 24-Kilogram, Herbert

Tinius Olsen Testing Machine Co., 500 N. Twelfth St., Philadelphia, Pa. [Vol.61,p. 553.]

This large pendulum is adapted for testing large work. The device is identical in principle with the former



smaller model. It can be used for testing shafts or rolls up to 30 in. in diameter, and at any point on plates or other flat surfaces up to 30 in. wide. It is also adapted for use on drums or large gears of any diameter and up to 30 in. wide, and can be used inside a hole such as the bore of a gun or a large bearing. The weight is 24 kilograms.

— 152 —

Tester, Hardness, Rockwell Model 4-B

Wilson-Maeulen Co., 383 Concord Ave., New York, N. Y. [Vol.61,p.592.]

This instrument operates on the same principle as the former models of the device but will accommodate larger pieces. The device measures the hardness by penetration and records the resistance of the metal to the penetration of the test point upon a direct-reading dial. The loads and penetrators are the same as for the smaller models and the hardness scale is also the same. The

instrument will test pieces up to 12 in. thick and to a distance of 7½ in. from the edge.

— 153 —

Tester, Brinell, Power-Operated

Pittsburgh Instrument & Machine Co., 1026 Reedsdale St., Pittsburgh, Pa. [Vol.61, p.594.]

This device will give a larger output than the former hand-operated model. The essential features are the same as in the hand-operated

machine. The motor drives the pump through a worm and wormwheel, and the operator depresses the lever at the front of the machine to start the test. The movement of the lever closes the needle valve and the required test load of 3,000 kg. is created in a few seconds. The controlling weights then rise and the action of the pump is automatically disengaged. The lever is then raised and the needle valve opens, permitting the removal of the test piece for reading the diameter of the impression.

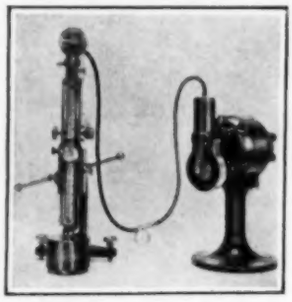
Its operation is simple and takes but little time.

— 154 —

Actuator, Automatic, for Model C-1 Scleroscope, "Sico"

Shore Instrument & Manufacturing Co., Van Wyck Ave. and Carll St., Jamaica, N. Y. [Vol.61,p.595.]

This device is designed to relieve the operator of the necessity for muscular effort, except that of pressing a small trigger, when the scleroscope is continuously operated on mass production. The actuator is attached to the scleroscope by means of a rubber tube. It consists of a small motor-driven pump that runs continuously and has the same suction and compressive force as the usual rubber bulb in the hand of the operator. The motor operates at the proper speed for operating the scleroscope in ordinary service. In the rubber tube a



trigger-operated control valve is located. When using this device a succession of tests can be made without the use of the trigger, except to hold it drawn in.

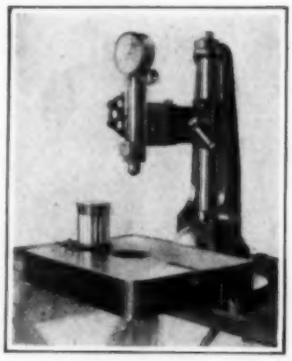
The timing for drawing up the hammer, the release and rebound, is done automatically by the speed of the actuator, and so arranged that the hammer is drawn up after each rebound and held.

— 155 —

Scleroscope Set, Non-Portable, Improved

Shore Instrument & Manufacturing Co., Van Wyck Ave. and Carll St., Jamaica, N. Y. [Vol.61,p.595.]

This apparatus is a non-portable combination of a clamping stand and a separate swing arm and post, for use with the scleroscope. The apparatus has been



increased in size over the former portable model to accommodate large work. The heavy tilting table can be set at any angle and is graduated for accurate setting. For testing specimens having a part that must extend through the table, a removable center anvil is provided. The swinging arm is mounted on ball bearings and is rigid enough to permit clamping down the specimen.

— 156 —

Indicator, Test, "Last Word," D-10

H. A. Lowe, 1874-76 East 66th St., Cleveland, Ohio. [Vol.61,p.211.]

This dial indicator is designed for especially accurate work and is made to order only. With a plain lever it has a range of 0.016 in. and reads in ten-thousandths of an inch. The dial is adjustable. The lever has a small tapered hole near

the end to assist in the attachment of special-shaped contact ends when conditions require them.

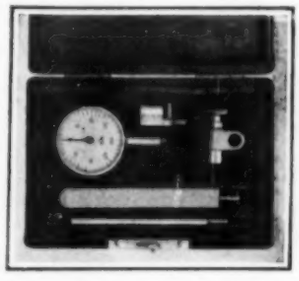
This taper measures 3 deg. in its included angle. The dial itself is adjustable.

— 157 —

Gage Set, Model 25

Federal Products Corp., 15 Elbow St., Providence, R. I. [Vol.61,p.674.]

This small pocket gage set is especially adapted to the use of tool-makers and others who have occasion to set up work on the lay-out plate or machine table. The set consists of a dial gage, a bell crank for changing the direction of movement, suit-



able extension rods, and a clamp by means of which the gage may be fastened to a height or surface gage. The dial is graduated to read in thousandths up to 0.040 in., which is the full range.

The set is put up in a leather case of convenient size to be carried in the pocket of the operator as shown in the illustration.

— 158 —

Indicator, Dial, Model B

Waltham Dial Gage Co., 85 *Myrtle St., Waltham, Mass.* [Vol.61,p.859.]

In the design of this instrument an endeavor has been made to insure long life and continued accuracy. The indicator is divided into two units. The case unit consists of case, rack, guide pin, guide block and rack spring. The plate unit incorporates the wheels and pinions and their accompanying mechanism, and can

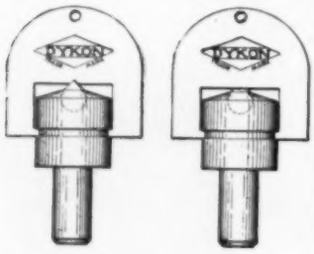
be removed from the case unit without disturbing any part of the latter. The instrument has a range of 0.3 in. and is graduated to read in thousandths.

— 159 —

Gage, Diamond, "Dykon"

Joyce-Koebel Diamond Co., Inc., 39 *West 32nd St., New York, N. Y.* [Vol.61,p.38.]

This gage is used to determine when a diamond needs resetting. The body of the mounting is grooved after the diamond is reset, the groove being so posi-



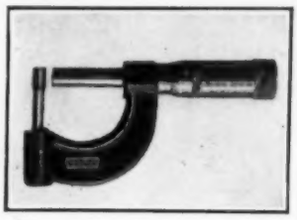
tioned that the diamond projects above the gage by the amount of wear to be allowed. When the diamond has worn to such an extent that the gage passes over it, it should be used no more until reset. It is said that the life of a diamond is greatly increased if it is always properly reset before too much wear occurs.

— 160 —

Micrometer, Tube

J. T. Slocomb Co., Providence, R. I. [Vol.61,p.480.]

This micrometer is especially adapted to measure the wall-thickness of tubes. The tool is of standard construction throughout, except that the frame is designed to support a stud extending at



a right angle to the measuring spindle and forming the anvil. The diameter of the stud limits the internal diameter of a tube that can be measured. The minimum internal diameter that can be accommodated by the tool is $\frac{1}{16}$ inch.

— 161 —

Micrometer, Inside, and Handle, No. 264

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.61,p.553.]

A set of extension rods is supplied by which this micrometer is given a range of measurement from 2 to 8 in. by thousandths of an inch. The complete instrument consists of a micrometer head with a range of $\frac{1}{2}$ in., six rods and one spacing collar. The outer shell is slit in two

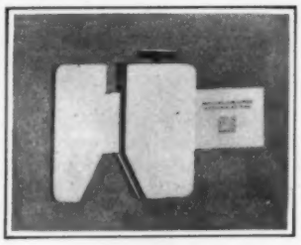
places, the metal between the slots forming a shoe which can be forced against the thimble by means of a thumbscrew. This clamping arrangement is an improvement on this type of inside micrometer as it permits the locking of the thimble at any reading and prevents its turning while in use. The handle consists of a hook with an adjustable brass plug that is pressed against the micrometer by turning the knurled shank.

— 162 —

Gages, Thread Tool, No. 577

Brown & Sharpe Manufacturing Co., Providence, R. I. [Vol.61,p.554.]

With these gages it is possible to measure or check threading tools for all shapes of threads from a sharp V-thread to one with a 1-in. flat. The three gages cover the U. S. Standard, the Acme Standard and the Whitworth Standard threads, the angles



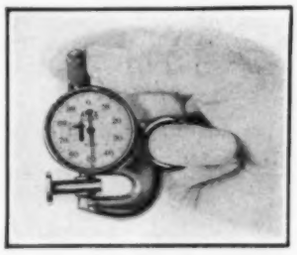
of the respective measuring surfaces being ground to 60, 29 and 55 degrees. To set a gage, a plug gage or a piece of stock of the proper dimension to suit the width of flat required is inserted in the opening on the top of the gage.

— 163 —

Gage, Thickness, Pocket

B. C. Ames Co., Waltham, Mass. [Vol.61,p.673.]

This instrument is very compact and reads in thousandths of an inch. The frame is of bronze and has a ring through which a finger may be inserted to hold the gage, while the thumb and



forefinger are used to open and close the jaws, as shown in the accompanying illustration. The large pointer records the reading in thousandths and the small pointer indicates the number of revolutions made by the large one. The gage has a capacity of $\frac{1}{4}$ in.

— 164 —

Gage, Specimen, Impact, Izod

F. H. Bultman Co., Cleveland, Ohio. [Vol.61,p.861.]

The purpose of this apparatus is to facilitate the inspection of specimens to be tested on the Izod impact testing machine and insure that the same standard is maintained by all users. A hardened and ground standard specimen is furnished

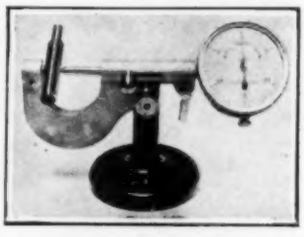
and all specimens are made to conform with it. The standard is first placed on the table of the gage and the dial reading is taken with the V-bar of the device in the bottom of the groove of the specimen. The specimen itself is then gaged and its variation from the standard is determined by the dial readings. A forming cutter for milling the notches is also furnished.

— 165 —

Gage, Pitch-Diameter, No. 45

Federal Products Corp., 15 *Elbow St., Providence, R. I.* [Vol.61,p.980.]

This gage consists of a bow-frame with fixed anvil and sliding spindle, to the end of which is attached a standard Federal dial gage. The instrument is adjustably mounted on a heavy standard, suitable for use on a work-bench. Screw holes in the base of the standard allow it to be permanently fastened in one position on



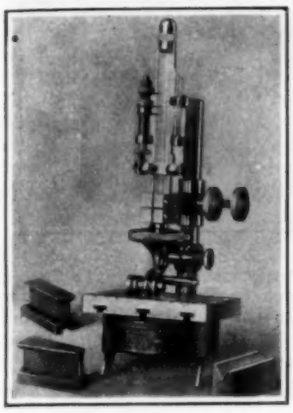
the bench if desired. The gage is one of comparison only, and is intended to be used as an inspection gage to show deviation above and below the nominal size of a standard threaded plug to which it is set before using.

— 166 —

Gage, Micrometer, Fluid, Improved

Coats Machine Tool Co., Inc., 110 *West 40th St., New York, N. Y.* [Vol.61,p.903.]

This machine is manufactured under the Prestwich patent and was previously



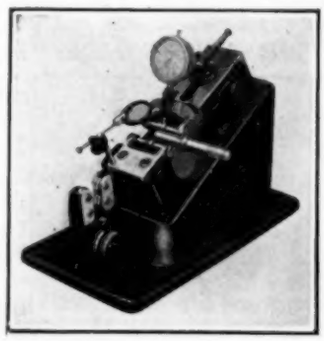
described on page 86, Vol. 46, of the *American Machinist*. Among the improved features of the instrument are included the use of collapsible feet so that the operator can tilt the base back, and the provision of T-slots in the surface plate. The T-slots make it possible to slide the surface plate back and forth so that it can be used evenly all over its surface. The base has a longitudinal slot to make the motion of the surface plate entirely universal. The backstop clamping around the column can be adjusted at any angle or reversed. Parallel and taper anvils are furnished for shoulder work, together with a V-block for gaging parts ground on a centerless grinder.

— 167 —

Lead Tester and Comparator, Screw Thread

John-Sons Gage Works, 67 Blue Hills Ave., Hartford, Conn. [Vol.61,p.79.]

This device is built in two sizes to accommodate screws from No. 0 to 1¾ in. in diameter. The cradle for the screw is composed of annular gaging elements that are free to rotate upon their holding stud and, with the exception of one fixed stud, can also move laterally to adapt themselves to the lead variations of the screws to be measured. A wedge-shaped plunger running in a groove in the "indicator roll" contacts with the spindle of the indicator and records the lead errors. The lower rolls are for testing the form of the thread. A magnifying glass is provided and the background is painted white.

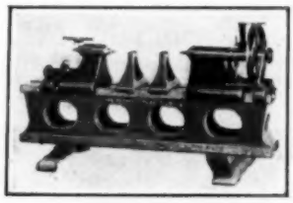


— 168 —

Measuring Machine and Comparator

Bethel-Player Co., Westboro, Mass. [Vol.61,p.521.]

This is a precision measuring machine by means of which variations in dimensions of 0.00001 in. can be detected. The device embodies a tilting level mounted upon the end of an amplifying arm in such a manner that a displacement of the measuring anvil through 0.0002 in. causes a 1-in. movement of the bubble.



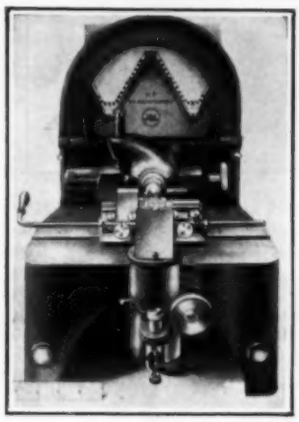
The machine does not render arbitrary measurements, but determines the amount of variation between a piece of work and a standard gage block or measuring rod. The machine measures any length from zero to 12 in., and to the center of a 9-in. circle. The bed is 4½ in. wide by 33 in. long and 7 in. deep. The machine is provided with a pair of V-blocks as shown in the illustration. Its weight, fully equipped, is 140 pounds.

— 169 —

Comparator, Screw-Thread, Bench-Type, "Hartness"

Jones & Lamson Machine Co., Springfield, Vt. [Vol.61, p.707.]

This instrument embodies the same principles and accomplishes the same purposes as the standard machine, but is much more compact and convenient to handle. A 6-8 volt, 32 c.p. Mazda lamp is located in a chamber in the base of the machine, its light passing upward through condensing lenses that produce a parallel beam, the direction of which is changed to the horizontal by a prism. From the prism the beam passes through the projecting lens to a tilted mirror at the rear



of the hood, by which it is reflected to a screen located near the front of the hood and directly before the operator. The screw to be inspected lies in a cradle in such a manner that the threads are in the beam of light and their shadow is projected on the screen. The screen is a tracing-cloth chart of a perfect screw thread drawn to a 50-to-1 scale.

— 170 —

"Telemagnifier"

Bausch & Lomb Optical Co., Rochester, N. Y. [Vol. 61,p.36.]

This optical instrument is especially adapted for reading such instruments as thermometers, gages and dials, or observing of parts of machines when the object is from 30 in. to 30 ft. from

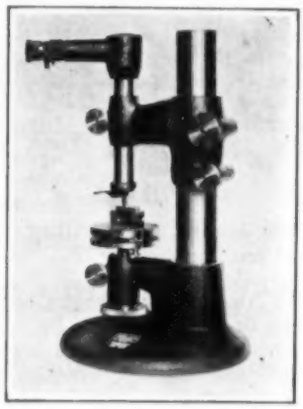
the observer. The instrument has an exceedingly long focusing range and can be quickly adjusted for varying distances. It is a prism glass giving magnifications from six to nine diameters, depending on the distance. The device is small and compact so that it can be carried in the pocket and used with one hand.

— 171 —

Optimeter, Carl Zeiss

George Scherr, 143 Liberty St., New York, N. Y. [Vol. 61,p.560.]

This instrument is designed for the measuring, checking, and inspection of quantity products by comparison with a known standard. The feature of the instrument is the incorporation of an optical method of measurement that eliminates all moving parts, with the exception of a small mirror. The mirror is mounted on two steel balls and is tilted a few thousandths of an inch by the action of the feeler point. The entire optical system is



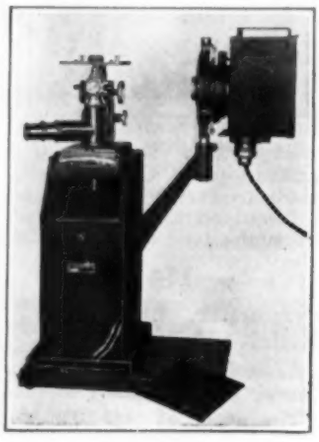
housed in a right-angle tube, adjustably mounted in an arm on a sturdy column. A beam of light is reflected into a scale by means of a small mirror located just behind the eyepiece. The reflection of the scale passes to a prism at the angle of the tube, downward to the small tilting mirror near the bottom of the tube, and then back through the same system to the eyepiece. As the mirror is tilted the image of the scale moves vertically in front of the eye of the observer and the amount of the movement can be read by reference to a stationary index line. The smallest division on the scale is 0.00005 in. and readings to 0.00001 in. can be estimated.

— 172 —

Metallographic Equipment, Simplified

Bausch & Lomb Optical Co., Rochester, N. Y. [Vol. 61,p.41.]

For general routine metal-



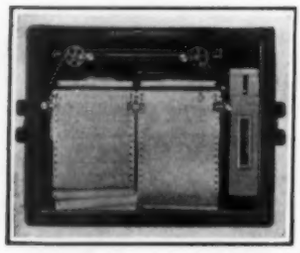
lographic inspections magnifications above 200 diameters are seldom required and for such use this simplified equipment is designed. The apparatus is a compact unit with all the parts mounted on one base and with the light source in a fixed position. The equipment includes an inverted microscope, a camera and a special ribbon filament illuminant. It is said to be easy to operate, portable, and especially suited for low power work. The magnifications vary from 64 to 200 diameters.

— 173 —

Pyrometers, Recording and Indicating

Republic Flow Meters Co., 2240 Diversey Parkway, Chicago, Ill. [Vol.61,p.859.]

This is a line of indicating and recording pyrometers, together with the usual thermocouple accessories. The recording instrument is illustrated. The clock has a complete time element with the usual escapement and its own main spring, and performs no other function than to release the operating energy through the power escapement. Two independent charts are used instead of printing two scales on one piece of paper. Standard charts are carried in stock with temperature ranges from 32 to 800 deg. F. up to 32 to 3,000 deg. F. The charts are 6 in. wide, the actual scale range being 5¼ inches. The wall-type indicating pyrometer has a moisture-proof 12-point selective switch. The scale is wide so that the graduations are open and easily read. Four thermocouple elements can be supplied and are standard. These employ both



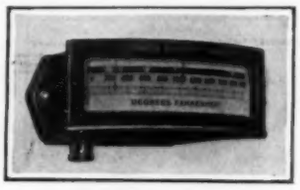
precious and base metals. Moisture-proof thermocouple heads are furnished as standard equipment for the thermocouples.

— 174 —

Pyrometer, Indicating, Model 420

Bristol Co., Waterbury, Conn. [Vol.61,p.980.]

The scale of this instru-



ment is 7 in. wide and provided with a mirror to eliminate errors in reading due to parallax. As an aid to easy visibility a combination pointer is provided, having a broad section for distance reading, and a knife-blade section for accurate close-up work.

The measuring element is a high-resistance millivoltmeter. As a part of the standard equipment the instrument is provided with the Bristol automatic internal cold end compensator.

— 175 —

Testing Machine, Gear, Société Genevoisé

R. Y. Ferner Co., Investment Bldg., Washington, D.C., [Vol.61,p.635.]

This machine can be used for testing the pitch, eccentricity and tooth profiles of gear wheels. Bevel and helicoidal gears, as well as spur gears, with both straight and helical teeth, may be examined with it. The bed

of the machine may be set horizontally for the testing of pitch and eccentricity, or it can be turned up on end for tooth profile measurements. The gear to be tested is mounted on a mandrel between adjustable centers. Suitable dials and contact pieces for examining the pitch and eccentricity are attached to a cross-piece that can be adjusted along the ways of the bed. The machine will accommodate gear wheels up to 11¼ in. in diameter and the maximum length of mandrel that can be used is 15¾ inches.

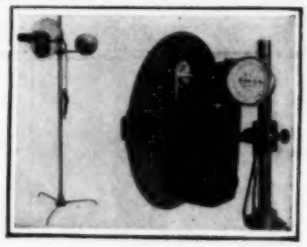
— 176 —

Tachometer Attachment for "Rotostat"

Rotostat Instrument Co., 220 North 13th St., Philadelphia, Pa. [Vol.61,p.978.]

This attachment allows direct speed readings of distant or inaccessible machinery and machine elements.

The "Rotostat" itself is an instrument by means of which a mechanism, while actually running at full speed, may be made to appear slowly moving or to assume apparently station-



ary positions. The attachment to the "Rotostat" permits the simultaneous use of a tachometer, giving the actual speed of the mechanism under observation.

Material Handling

— 177 —

Hoist, Electric, C-M

Chisholm-Moore Manufacturing Co., Cleveland, Ohio. [Vol.61,p.289.]

The essential parts of this hoist include a standard enclosed crane motor; a controller especially built for

hoist service; two reductions, of spur gears; a Weston load brake; a winding drum; a hook block; and a mechanically-operated motor brake. A feature of the machine is the fact that all the operating parts of the mechanism can be removed after taking out six bolts, and it is unnecessary to draw any keys to disassemble the parts. The hoist is adapted for use with the standard overhead track and trolley systems manufactured by this company.

— 178 —

Hoist, Electric "Lo-Hed"

American Engineering Co., Philadelphia, Pa. [Vol. 61,p. 555.]

This hoist retains many of the features of the other "Lo-Hed" hoists manufactured by this company, but is smaller and intended for general utility.

The load hook can be

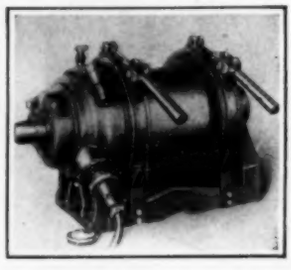
drawn up until it almost touches the rail, thus making the device available for use in places where the headroom is very low. Automatic holding and lowering brakes are provided, and a safety device checks the hoist and throws off the current at the upper limit of travel. Roller bearings are used and an automatic system of lubrication is provided.

— 179 —

Hoist, Portable, Electric

Sullivan Machinery Co., 122 South Michigan Ave., Chicago, Ill. [Vol.61,p.632.]

This hoist is made with either single or double drums, the single-drum hoist being illustrated. The motor is supported in one end of the frame and supplies power



to the hoisting drum through reduction gears. The drum is 11¼ in. in diameter and 8¼ in. long. The cable capacity of the drum is 500 ft. A 6½-hp. motor furnishes sufficient power to lift a dead load of 2,000 lb. at a speed of 110 ft. per min. on single lines. In the double-drum hoist the motor is mounted between the drums on a central standard. Each drum is 11¼ in. in diameter and 6¼ in. long, with sufficient capacity for 250 ft. of ⅝-in. wire rope. The motor is enclosed so that dust and dirt are excluded.

— 180 —

Hoist, Electric, Type R

Roeper Crane & Hoist Works, Inc., Reading, Pa. [Vol.61,p.857.]

The mechanism of this hoist is driven through worm gearing. A standard motor is used and rests on its feet on an extension of the hoist frame. An automatic stop of the trip-lever type provides safety control at the extremities of the lift and

can be adjusted for any length of hook travel. Since the drive for the drum is self-locking, a load brake is not required. The motor has a mechanical brake acting in series with the controller, so that the load is always brought to a quick stop without drifting. The controller is a single-speed device of the drum type. Push-button control can also be furnished, in which case the motor is equipped with a magnetic brake and the machine has an adjustable electric upper and lower limit switch.

— 181 —

Crane, Tractor, Crawling, "Industrial," 10-Ton

Industrial Works, Bay City, Mich. [Vol.61,p.36.]

An important feature of this crane is the independent control of the traveling, slewing and hoisting motions. These motions may be utilized in a variety of combinations that give speed and efficiency of operation. The upper works rests on a rotating steel base for rigidity and good alignment and the base is mounted on four conical rollers which can be removed without jacking up the crane. A

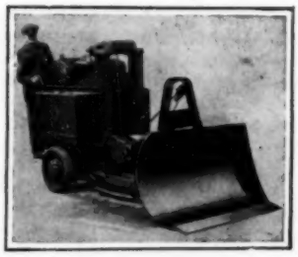
pressure system for lubrication is installed. Adjustable idle sprocket bearings take up the slack of the tractor belt and five 25-in. rollers decrease the traveling friction. The steel bed plate carries the track for the swiveling rollers and the external slewing rack. The crane is built for either steam, electric, or gasoline power. It is readily convertible into a shovel or a pile-driver.

— 182 —

"Tructor," Elevating and Stacking

Elwell-Parker Electric Co., Cleveland, Ohio. [Vol.61,p. 865.]

This machine is for transporting and stacking bulky cylindrical and rectangular



packages. The machine will handle rolls of various kinds of merchandise such as textiles and paper, as well as barrels, bales and boxes of various sizes and shapes. The unit consists of an elevator tructor with a revolving apron or cradle for securing the load at the end of the platform, the cradle being built to suit the load that is to be handled. The load is raised or lowered by operating the elevating platform, and the cradle can be revolved to any position from the horizontal to the vertical by means of an additional hoisting unit. The elevator raises the lower end of the load to a height of 6 ft., so that material 6 ft. high can be stacked end on end.

— 183 —

Truck, Platform, Elevating, Special

Crescent Truck Co., Lebanon, Pa. [Vol.61,p.904.]

This is a special elevating platform truck, in which the platform is 17½ in. above the floor when lowered and 22 in. above the floor when raised.

The main feature that is an improvement over the

same type of truck with a 12-in. platform, is the use of rear wheels 15 in. in diameter. This gives 6 in. of clearance underneath the platform. All the tires are 5 in. wide. The truck is designed throughout for heavy service and has a lifting capacity of 6,000 pounds.

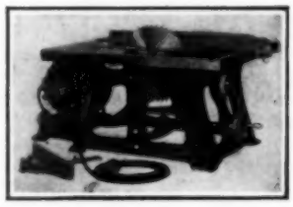
Woodworking Machinery

— 184 —

Bench Saw, Electric, Portable, No. 8, H. & A.

Heston & Anderson, Washington and Sixth Sts., Fairfield, Iowa. [Vol.61,p.327.]

This saw has sufficient capacity to cut wood 2 in. thick. The machine is fitted with a standard rip saw 8 in. in diameter and running at approximately 2,100 r.p.m. It can also be fitted with a cut-off saw or with a 6-in. dado head up to ¾ in. wide. The spindle mounting allows the saw to be raised and lowered in relation to the table by means of a handwheel at the front of the machine. A ½-hp. Emerson motor drives the machine and is mounted on a slide that is operated by the handwheel at the rear of the machine to keep the proper tension on the driving belt. The size of the table surface is



15 x 20 in. A ripping fence and a cut-off and miter guide are furnished.

— 185 —

Woodworker, No. 2, Improved

Buffalo Forge Co., 490 Broadway, Buffalo, N. Y. [Vol.61,p.359.]

The planing head now incorporated in this machine makes possible the planing of boards up to 8 in. in width. The planer table is made in two parts that fit into the channel on the main table and are adjustable on an inclined plane. A hinged planer guide is supplied and any angle required for beveling can be obtained. The bandsaw table is of the tilting style and its surface is

17½x14½ in. The machine is driven through gearing to insure smooth running conditions. The pulleys for the jointer and the bandsaw are connected to the drive shaft through jaw clutches, enabling independent operation.

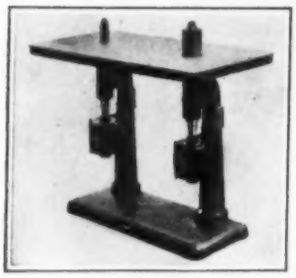
— 186 —

Sander, Double-Spindle

Porter-Cable Machine Co., N. Salina and Exchange Sts., Syracuse, N. Y. [Vol. 61,p.365.]

The pedestal, head and motors of this machine are the same as furnished on the single-spindle model made by this company. The machine is designed to provide equipment for the surfacing of two radii on one machine in order to save time and labor.

The machine table is 24x50



in. in size and is held by its pedestal 38 in. from the floor. Each spindle is equipped with a ½-hp. G.E. motor that runs at 1,800 r.p.m. The rolls are 6 in. long. The spindles are arranged to oscillate vertically as they revolve, the number of oscillations per min. being 60 and the vertical travel, 1¼ in.

— 187 —

Saw, Woodworking, Portable

Spring Grove Tool & Manufacturing Co., Spring Grove, Pa. [Vol.61,p.673.]

This is an electric portable combination wood-working saw. The machine is equipped with a Wagner ½-hp. motor that drives the saw at 3,400 r.p.m., and has capacity to cut wood up to 2 in. thick.

The 24x24-in. table is

made of cast iron and has provision for the addition of wooden extensions on either side if needed. The table can be tilted through an angle of 45 deg. and locked in any position. A cut-off and miter guide can be used on either side of the saw. The ripping fence will accommodate material up to 12 in. wide.

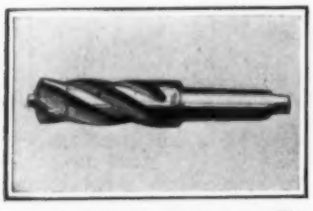
Small Tools

— 188 —

Drill, Core, Type C

Gairing Tool Co., Detroit, Mich. [Vol.61,p.172.]

For boring out or enlarging cored holes in forgings or castings this drill is made in a range of five sizes. It



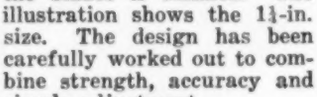
is of the built-up type. The cutting end is fitted with a taper shank that fits a recess in the fluted body. At the top of the tapered hole a recess for a hex nut is machined, and the draw-bolt for the cutter threads into this nut. The nut is held in place by a spring ring in a groove. The cutter is removed by the insertion of a small drift pin.

— 189 —

Reamer, Expansion, Ardee

Robert R. Davis Tool Co., Wyoming and Alfred Aves., St. Louis, Mo. [Vol.61,p.212.]

This is an expansion reamer that resembles a solid reamer in appearance. The irregularly-spaced high-speed steel blades are fitted into a special collet which is controlled by a single adjusting nut. Even adjust-



ment for the full length of the blades is claimed. The illustration shows the 1¼-in. size. The design has been carefully worked out to combine strength, accuracy and simple adjustment.

— 190 —

Milling Cutters and Counterbores

O. K. Tool Co., Shelton, Conn. [Vol.61,p.361.]

The high-speed steel teeth of these cutters are driven endwise into longitudinal slots. The backs of the teeth are serrated lengthwise, the serrations being spaced 0.050 in. apart. The serrations are cut with a formed milling cutter and, when the teeth are new, the serrations of all teeth are spaced equally from the cutting edges. Corresponding serrations are broached in the slots of the tool body. The spacing between the serrations in the slots is the same as those of

the teeth but, as each successive slot is broached, the broach is moved radially away from the center line a certain distance determined by the number of teeth in the cutter. When the diameter of the tool has been decreased by wear, the teeth are all driven out and reinserted in the slots in such a manner that the cutter can be reground to its original size. Resetting can be done in this way as many times as there are radial advances in the sequence before all of the teeth have been advanced one serration. As three or four of the serrations are available before the hold upon the tooth becomes too insecure to be trusted further, the life of the tool is indefinite.

— 191 —

Center, Adjustable, Robinson

Eclipse Interchangeable Counterbore Co., 7410 St. Aubin Ave., Detroit, Mich. [Vol.61,p.365.]

The design of this device has not been changed by the present manufacturers but the method of manufacture has been improved. The center was formerly hardened only on the outside, the hole for the insert being only drilled and reamed. The body of the center is now hardened and ground both on the inside and on the outside, the result being a device that wears better.

— 192 —

Tool Bits, Ground

Gorham Tool Co., 2206 Twelfth St., Detroit, Mich. [Vol.61,p.365.]

These tool bits are of high-

grade steel and of uniform hardness. They are made from over-sized hot-rolled bars that are cut to standard lengths with a bevel on each end. After heat-treating, the bits are again ground square and to size. The bits are made in sizes from ¼ in. to ⅝ in. square, and from 2½ to 5 in. long.

— 193 —

Gear Cutters and Hobs

O. K. Tool Co., Shelton, Conn. [Vol.61,p.404.]

This is a line of gear cutters and gear hobs to which the O. K. type of inserted tool is applied. The smaller sizes of both cutters and hobs have a single row of teeth, each tooth being

made of flat stock and driven into suitably shaped slots in the body. Each tooth conforms to the outline required to cut the space in the gear. The larger sizes have three, five or six rows of cutting teeth. The bodies for the smaller sizes of hobs are cut from bar stock in a lathe, no accuracy of either pitch or tooth contour being necessary. The larger sizes of hobs are made in sections, and the sections are then assembled with interlocking keys on a special arbor. In both types of hobs and cutters the actual tooth contour is obtained after the tools are all assembled, the work being done with pencil wheels in a special grinding machine. The hobs are made in 2, 1½, 1¼ and 1 diametral pitch sizes, and the disk cutters in any desired size from 1-in. circular pitch up. Hobs shown are for 1 diametral and 5-in. circular pitch.

— 194 —

Reamer, Die-Cast

Conradson Tool Corp., 2539 Woodward Ave., Detroit, Mich. [Vol.61,p.441.]

In this line of reamers high-speed blades are cast

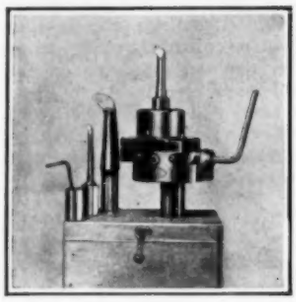
in place in the body. The melting-point of the alloy of which the body of the tool is constructed is much below the drawing-point of the blades, so that the cutting properties of the blades are not lost in the casting operation. These reamers are manufactured in both shell and chucking types, and in a variety of sizes from 1 to 5 in. in diameter.

— 195 —

Boring Tool, Adjustable, "R & G"

Ribbe & Grey, 308 *Tecumseh St., LaPorte, Ind.* [Vol. 61,p.710.]

This tool is fitted with a micrometer adjustment on the cross-slide and is adapted for use on drilling or milling



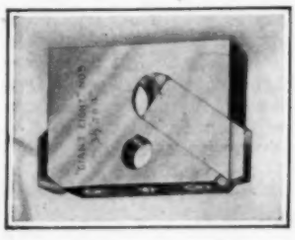
machines. The construction of the shank makes the tool adaptable for use in a universal chuck. Straight- or taper-shank holders can be fitted for mounting in any machine spindle. The dovetailed cross-slide has a traverse of 1 in., the micrometer adjustment being graduated in thousandths.

— 196 —

Boring Tool, Expanding Block

Davis Boring Tool Co., 3730 *Forest Park Blvd., St. Louis, Mo.* [Vol.61,p.787.]

This is an expanding block-type boring tool. The device is a self-contained unit, consisting of a steel block carrying two cutters that are locked in position by means of adjusting and locking screws. When set, the tools are locked in position by set screws, so placed that they will force the cutters back against the expanding screws and against the sides of the blade-slots, thus forming a rigid tool. A set of eight blocks covers a range of from ¾ inch to 18 inches, inclusive, and multiple block cutters can be supplied to bore, face or counterbore two, three or more sizes simultaneously.



— 197 —

Disk, Abrasive, Spiral, "Titan"

Charles H. Besly & Co., 118 *N. Clinton St., Chicago, Ill.* [Vol.61,p.827.]

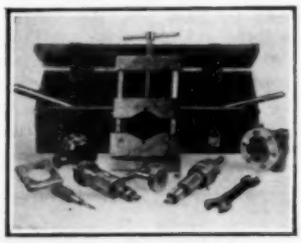
This spiral abrasive disk is especially adapted for grinding large surfaces and for grinding thin work that is easily heated and warped. The abrasive portion of the disk is made up in the usual way with a cement bond, but is placed in spiral ridges with clearance spaces between them as shown in the accompanying illustration. The clearance grooves run practically down to the cloth. The advantages claimed for this disk include a better cutting quality of the disk due to the shearing action of the ridges, and the opportunity provided by the clearance grooves for the escape of the grindings.

— 198 —

Tools, Standardization, Hose Coupling, "Threadwell"

Wells Corp., Greenfield, Mass. [Vol.61,p.328.]

These tools are designed for changing the many existing standards of fire hose threads to the National Standard thread recently adopted by the A.S.M.E. and approved by the National Screw Thread Commission. Because the material of which hose couplings are made is somewhat soft, an undersized male fitting can be expanded by using the proper tool in the set, until its outside diameter is somewhat greater than the National standard. The dies provided for the purpose are then run over the expanded part and change the thread to the standard. A similar operation is performed on the coupling except when it is impossible to draw it together.



— 199 —

Diehead, Taper, Reverse, 1½-In.

Landis Machine Co., Waynesboro, Pa. [Vol.61,p. 552.]

This diehead has been designed in order to overcome the difficulty in threading crown bolts, in which the present practice of threading the bolt from the small to the large end sometimes causes the nicking of the body of the bolt. This device cuts the thread from the large end to the small end of the bolt. When this diehead is used, the square on the end of the bolt does not have to be true with the body as the bolt is gripped on the body and not on the square. The maximum diameter of bolt that can be threaded is 1⅞ in. and the maximum taper of thread is 2 in. per foot. The diehead is operated by two trip rods attached to the carriage front of the machine and fitted with adjustable nuts to engage the lugs of the yoke ring. The head can be applied to any Landis threading machine with a capacity of 1½ in. or more.

— 200 —

Tap, Staybolt, Spiral, Duplex

The W. L. Brubaker & Bros. Co., Millersburg, Pa. [Vol.61,p.1017.]

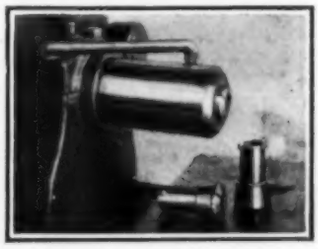
The reamer portion of this staybolt tap is made with right-hand spiral flutes to draw it into the work. The flutes of the tapping portion, on the other hand, have a left-hand spiral.

— 201 —

Chuck, Collet, Strobl

Universal Metal Products Co., 1134 *W. Lake St., Chicago, Ill.* [Vol.61,p.171.]

This self-contained collet chuck can be attached to the machine in the same manner as the ordinary chuck. It consists of a body into which are fitted a steel collet actuating ring and the collet. The collet is inserted and located by turning it until the lugs engage the ring. A screw is turned by a special wrench and operates a cam movement that draws the collet in. Two sizes of the device are furnished, giving capacities from ⅛ to 1 inch. The chuck can be furnished to screw on the nose of the machine spindle or with a flange to fit an adapter.

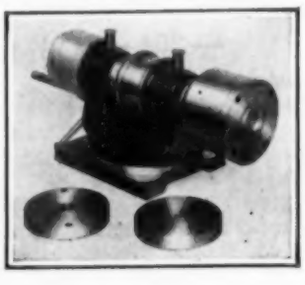


— 202 —

Chuck, Magnetic, Rotary, 4-R

O. S. Walker Co., Inc., Worcester, Mass. [Vol.61,p. 402.]

This chuck is of the standard two-pole concentric type that requires an auxiliary faceplate to conform to the particular piece of work for which it is to be used. It is particularly adapted for the grinding of saws, cutters, ball and roller bearing parts and many other articles having small diameters.



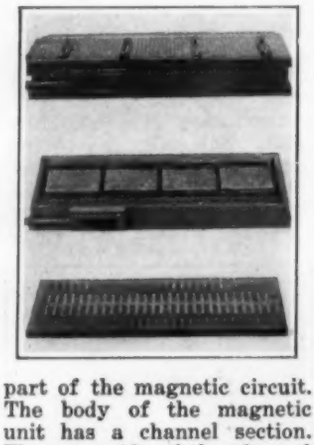
The contact rings and shoes are located at the rear end of the spindle and are protected from water and dust by an aluminum guard.

— 203 —

Chuck, Magnetic, Bipolar

Taft-Peirce Co., Woonsocket, R. I. [Vol.61,p.518.]

This chuck is built under the Simmons patents. As in all Simmons chucks the magnets are insulated from the shell or casing of the chuck, so that the latter is not a



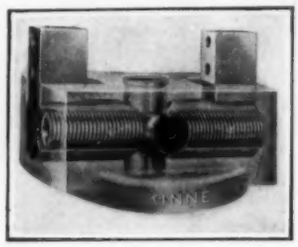
part of the magnetic circuit. The body of the magnetic unit has a channel section. The open side of the channel is uppermost and the edges are flush with the edges of the chuck casing that contains it. The core of each coil is made in two parts, the lower part oval in section and cast integral with the channel, and the upper part, ending in a rectangular shaped pad, attached to it by machine screws after the coil has been placed in position. The edges of the channel form one pole and the rectangular pads of the central cores the opposite pole of the magnet. All exposed surfaces are ground flat after the magnetic unit is assembled in the casing. One-half of the pole-pieces in the chuck face have a rectangular foot at each end to bear upon the edges of the channel the intervening pole-pieces being cut away at the ends and bearing only upon the rectangular pads at the center. A rotary style is also made in which the frame constitutes one magnegtic pole.

— 204 —

Chuck, Two-Jaw, "Box-Body"

Skinner Chuck Co., New Britain, Conn. [Vol.61,p. 672.]

This chuck is especially adapted for production work on odd-shaped pieces and is designed for use on turret lathes and other similar machines. The feature of the chuck is the design of the jaws, the bearing parts of which are cylindrical in shape and fit smoothly into a round hole through the body. The chambers in which the jaws slide are slotted through to the face



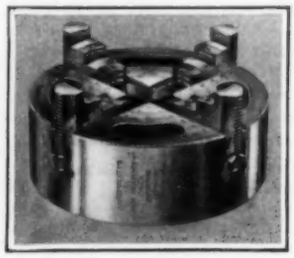
of the chuck for a short distance only, thus leaving the central portion entirely closed. The screw is a single piece of chrome-nickel steel, hardened and ground. The strain upon the screw is balanced, and it therefore exerts no end thrust in either direction. A hardened and ground plug, entered from the side of the body, partly encloses the reduced shoulder between the threaded portions and retains the screw in its central position. The chuck is made in 7½- and 9-in. sizes.

— 205 —

Chuck, Lathe, Independent, Junior, IXL

Westcott Chuck Co., Oneida, N. Y. [Vol.61,p.712.]

This independent lathe chuck has recently been developed for use in manual training schools and for light lathe work in industrial machine shops. The design of the chuck is exactly similar to the standard



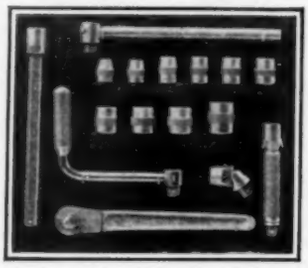
chucks made by this company, the only difference being that the body, jaws, screws, etc., are relatively lighter in weight. Each jaw screw is provided with a hardened steel carrier for the purpose of distributing the thrust, so that the body will not be sprung or broken. The chuck is made in 5-, 6-, 8- and 10-in. sizes.

— 206 —

Wrench Set, Standard

Husky Wrench Co., Milwaukee, Wis. [Vol.61,p. 252.]

The full set of these



wrenches includes sockets for hexagon nuts from $\frac{1}{16}$ to $\frac{1}{2}$ in. varying by sixteenths, except in two cases where thirty-second sizes are furnished. Ratchet handles, T-handles, offset handles, crank handles, extensions and universal joints can be supplied so that the wrenches can be used in cramped places. All parts are made from drop forgings and are heat-treated.

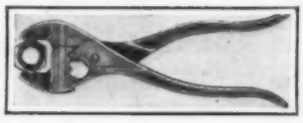
The wrenches may be bought in any combination of sockets and handles desired.

— 207 —

Plier and Wrench, Combination

Grip-N-Stik Co., Dover, Ohio. [Vol.61,p.941.]

This combination plier and wrench is especially intended for the use of mechanics. The tool is made from three drop forgings accurately machined and case hardened.



Its length is 7 in. and its weight 10 ounces.

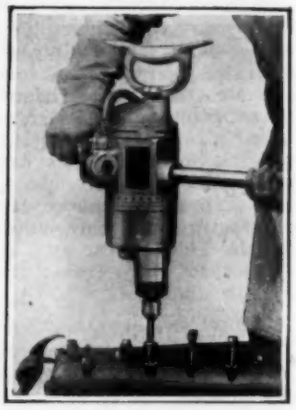
As a plier the jaws of this tool are always parallel and they can be easily adjusted to four positions with one hand. Using the tool as a wrench, a nut can be gripped by the corners as well as the sides. The range is from a cotter pin to the nut on a ¾-in. bolt.

— 208 —

Wrench, Socket, Electric, Reversible, No. 3

Black & Decker Mfg. Co., Townson, Md. [Vol.61,p. 1019.]

The reversible electric



socket wrench is adapted to assembling and disassembling work with gasoline motors or similar machinery. It differs from the standard line of tools built by the Black & Decker Mfg. Company in that the spindle is provided with a clutch that releases automatically when the forward pressure on the tool is relieved. A nut, bolt or stud can be driven to any desired degree of tightness. A reversing switch is also provided.

— 209 —

Tool Models. Planer

G. A. Gray Co., Cincinnati, Ohio. [Vol.61,p.41.]

These models of planer tool shapes recommended for use on Gray planers are made of aluminum and are

to be used as guides in forging and grinding the tools. The models are mounted in a convenient rack and an instruction chart is provided. The complete set includes 16 models.

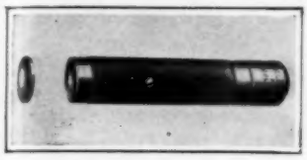
Shapes 1, 2, 3, 4 and 5 are roughing tools for cast iron and steel; 6 and 7 are square-nose tools for cast iron; 8 is a goose-neck finishing tool and the rest are shapes of tools used in machining dovetails.

— 210 —

Set, Welch Plug

Eclipse Interchangeable Counterbore Co., 7410 St. Aubin Ave., Detroit, Mich. [Vol.61,p.288.]

This tool is intended for use in properly setting Welch expansion cored-hole plugs. Heretofore, the method most commonly



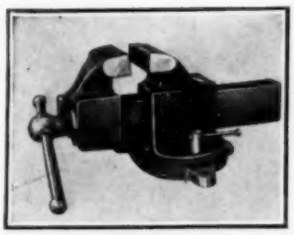
used for the insertion of these plugs has been to insert them into the counterbored holes in the casting and then strike them with a hammer. This method produced many cracked castings and leaky joints. By using the Eclipse plug-setting tool, the hammer cannot come in contact with the wall of the casting and the plug cannot be concaved.

— 211 —

Vise, Swivel-Base, "Simplex Gray"

Simplex Tool Co., Woonsocket, R. I. [Vol.61,p.480.]

The entire line of vises made by this company is now being furnished with swivel bases. The slides of



these vises are of steel and the bodies are of a toughened grade of crucible iron. The jaws are of tool-steel, serrated, hardened and ground. The screws are of steel, with the square thread machine cut. The nuts are of malleable iron and have long bearing upon the screws. The vises can be furnished in sizes from 3½ to 7½ in., measured on the width of jaw, and with openings from 4½ to 12 in. respectively.

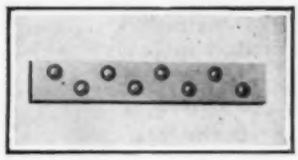
— 212 —

Parallel, Ball

J. F. Smith Tool Co., 33 Westview Ave., Dayton, Ohio. [Vol.61,p.747.]

This ball parallel is designed for use with heavy work on the drilling machine. The arrangement of the balls in sockets in the plates allows the drill or counterbore to pull the work into line with the spindle.

The device is furnished in two sizes, the smaller being 6 in. long, 1 in. wide and



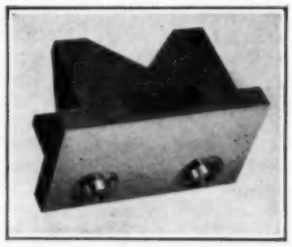
carrying ¼-in. balls. The larger parallel is 7 in. long, 1 in. wide, and is furnished with ⅜-in. balls.

— 213 —

Support, Work, V-Type

Crescent Engineering Co., 404 Conway St., Baltimore, Md. [Vol.61,p.788.]

This all-purpose V-block is fitted with locating pins. The device can be used on a drill, layout table, or in connection with the slots in the table of any machine tool. The pins are held in the extended position by spring



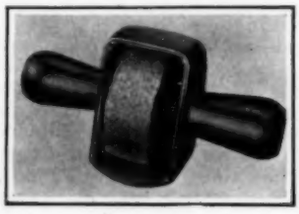
pressure and can be pushed into the body of the block and locked in position quickly. With the pins up, the V-block can be used anywhere in the usual way. The blocks are made in three types, designated V-99, V-100 and V-101. They will accommodate rounds from ⅜ to 3 in. in diameter, and blocks for work of larger diameter can be furnished.

— 214 —

Dressers, Wheel, Abrasive

M. & S. Mfg. Co., Hartford, Conn. [Vol.61,p.1019.]

The wheel dresser shown with two handles is in-



tended to be used in the hands of the operator for dressing and sharpening the large grinding wheels used for snagging, tool-grinding and similar purposes. The revolving member is a 3-in. by 1¼-in. 30-T Crystolon abrasive wheel. The center plugs, with concave ends, are mounted in each handle, one rigidly, the other adjustably. The ends of the bushing pressed into the wheel center are similarly concaved to fit a ⅜-in. steel ball. The wheel runs on two ⅜-in. balls when the device is assembled, provision being made to lubricate the bearing surfaces. The other dresser has the same type of bearing but the wheel is mounted in a base that makes it adaptable for use on the table or magnetic chuck of a surface grinder. A hollow post in one corner of the base provides a mounting for a diamond.

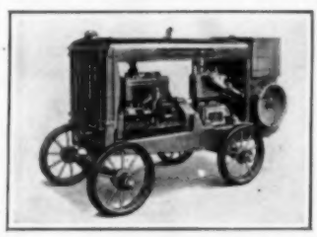
Miscellaneous Equipment and Supplies

— 215 —

Compressor, Air, Portable, 100-Ft.

Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y. [Vol.61,p.40.]

This portable compressor is driven by a gasoline engine and is adapted for use in a shop where isolated work might require an auxiliary air supply or where the small amount of air required might not warrant the



installation of a continuously running compressor of larger capacity. The machine will operate two riveting or caulking hammers. The compressor is of the vertical, single-acting duplex type and is fitted with a differential unloader that regulates the air supply. An auto-pneumatic throttle slows the engine to idling speed during the unloaded periods. The four-cylinder engine is connected to the compressor through a flexible coupling. A large radiator is provided for the engine and compressor. A cast-steel deck provides a base for the engine, the compressor and the air receiver.

The complete unit is supplied in the steel-wheeled or rubber-tired model, rubber-tired trailer type, or on a 1-ton Ford chassis.

— 216 —

Compressor, Automatic, Junior, Two-Cylinder

Dunning Compressor Co., Holmesburg, Philadelphia, Pa. [Vol.61,p.401.]

The motor and the pump of this compressor are mounted on the top of a 15-gallon tank, the whole outfit being a self-contained unit. The two cylinder pump has a 2-in. bore and a 2-in. stroke, being driven by a ½-hp. motor. An automatic stop and start switch is provided together with an automatic unloader. The work-

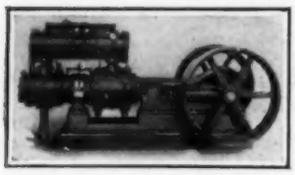
ing pressure is 125 pounds. The motor can be connected to any convenient electrical outlet.

— 217 —

Compressor, Air, Straight-Line, Two-Stage

Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y. [Vol.61,p.554.]

This machine may be driven either by motor or belt and is designated as



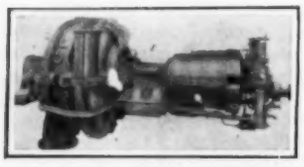
Class N-CTB. It operates at 275 r.p.m. and has a piston displacement of 360 ft. per min. Air pressures range up to 125 lb. per sq. inch. The tandem design has been used in an endeavor to produce a two-stage compressor of comparatively small piston displacement at a reasonable cost. This design is less costly than the duplex type, but makes available the savings due to two-stage compression. Automatic regulation of the pressure and volume of the air delivered is provided.

— 218 —

Compressors, Centrifugal

General Electric Co., Schenectady, N. Y. [Vol.61,p.978.]

These compressors will find their greatest applications in those instances where higher pressures than obtainable with single-stage machines



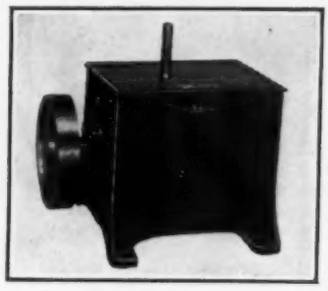
are desired, and can be used with advantage in pneumatic material-handling systems, gas exhausters, gas boosters and also in blowing blast furnaces and Bessemer converters, and in a number of other cases. The main line of compressors covers water-cooled machines designed to deliver volumes of from 3,000 to 60,000 cu.ft. per minute, at pressures up to 30 lb. or more. The line will also include two types of miniature, self-cooled machines designed to deliver volumes of from 250 to 1,400 cu.ft. per minute at pressures of from 2 to 6 pounds.

— 219 —

Pump, High-Vacuum, Two-Stage

Eisler Engineering Co., 750 South Thirteenth Ave., Newark, N. J. [Vol.61,p.80.]

This small vacuum pump is designed for such work as exhausting vacuum bottles and incandescent bulbs, filling serum tubes and spirit levels, and similar work that requires a high-vacuum pump of small capacity. The device is of the rotary type having a rotating piston in each stage with sliding vanes that press against the walls of the cylinders. Both pis-



tons are fitted on a common shaft and driven by a belt pulley at one end of the machine. The mechanism is immersed in oil that fills the casing.

— 220 —

Pumps, Lubricant, Motor-Driven, "Gusher"

Ruthman Machinery Co., Cincinnati, Ohio. [Vol.61,p.400.]

These pumps are constructed so they can be attached to a machine by four machine screws. This makes them adaptable for permanent parts of machines or as auxiliary equipment for use when the regular pump

equipment on a machine is out of order. The rotating parts run in ball bearings. A simple regulating valve is provided to control the amount of fluid delivered, and it is said that totally checking the flow does not injure the pump. No gears are used, there is no packing in the mechanism and priming is unnecessary. The machine can be quickly disassembled for cleaning. The motor is direct-connected to the pump.

The three models available differ only in capacity, model S-L delivering 15 gal., model H-L 30 gal., and model F-L delivering 80 gal. of lubricant per minute.

— 221 —

Furnace, Electric Rotary

Eaton Electric Furnace Co., Taunton, Mass. [Vol. 61,p.596.]

This is an electric furnace of the rotary type for tempering small drills, taps, etc., in production quantities. The body of the furnace is a horizontal cylinder of steel plates with cast-iron ends. The electric heating unit is carried in a semi-circular frame in the lower half of

the chamber. A rotating cradle occupies the center of the furnace. The work containers are hexagonal chambers of cast-iron, each fitted with a removable cover fastened in place with a bayonet locking device, so that it may be released by giving it a partial turn forward. The containers are entirely separate from the furnace and are loaded and sealed while still on the floor. Automatic pyrometric control maintains any desired temperature up to 800 deg. F. The cradle rotates continuously during the period of operation, the movement being slow enough not to interfere with the removal and replacement of containers and cover.

— 222 —

Furnace, Hardening, Electric

Eaton Electric Furnace Co., Taunton, Mass. [Vol. 61,p.671.]

This furnace is designed primarily for the purpose of hardening carbon-steel tools and dies and for the temper drawing of high-speed steels. It is cylindrical in shape and is mounted in a horizontal position at a convenient working height from the floor. The heating unit is a cylindrical shell of carborundum, around the outside of which the resistance coils are wound. The rear end of the heating chamber is closed by a plug that is easily removable to provide access to the heating unit. The unit is entirely independent and may be taken

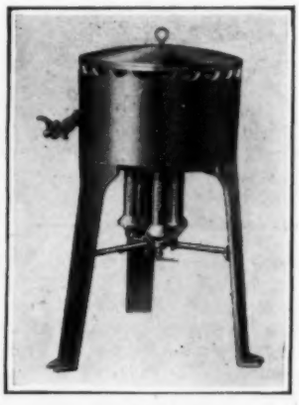
out for inspection or replacement by merely disconnecting the leads. The heating chamber is 9 in. wide, 15 in. long and 7 in. high. The capacity as a production furnace is approximately 100 lb. per hour. The current consumption varies from 3.3 to 14 kw. and gives temperatures from 1,400 to 1,800 deg. F.

— 223 —

Furnace, Melting, No. 305

Johnson Gas Appliance Co., Cedar Rapids, Iowa. [Vol.61,p.903.]

This furnace is designed for melting soft metals and is fitted with a removable



cast-iron melting pot with a capacity for 300 lb. of metal. The pot has a removable lid and an outlet valve for drawing off the molten metal. The heating element consists of three large direct-jet bunsen burners made by this company. These burners are said to be equal to an air-blast outfit in rapidity of heating, being at the same time more economical in gas consumption and easier to operate.

The over-all height of the furnace is 31 in. and the weight complete is 85 pounds.

— 224 —

Cleaner and Grader for Carburizing Compound

Brown Lynch Scott Co., Monmouth, Ill. [Vol.61,p. 633.]

The pot used for case-hardening may be dumped, either hot or cold, into the hopper at the top of this machine. This hopper is agi-

tated mechanically and the compound drops quickly into the machine where it passes over screens that take out the remaining particles of scale, slag, clay and other foreign substances. The dust and fine particles are also removed. The hopper separates the steel from the compound when the pots are dumped hot and can then be rolled over to the side of the machine, from which position the steel is dumped into the quenching vat. Screens with any desired size of perforation can be furnished to the customer's order.

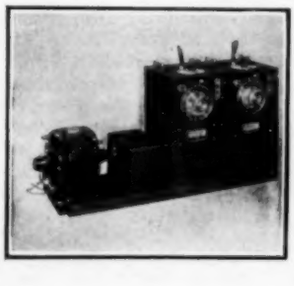
— 225 —

Controller, Temperature, Automatic

Wilson-Maeulen Co., Inc., 383 *Concord Ave., New York, N. Y.* [Vol.61,p.479.]

This automatic temperature controller is designed for use on oil, gas, electric, or steam-heated furnaces. The device will operate with standard power valves of the motor-driven, solenoid, or hydraulic type.

The complete machine consists of three standard interchangeable units. Power is furnished by a ½-hp. motor of commercial size and design,



and is transmitted to the control unit through a train of gearing running in oil. The potentiometer method is used in the control unit and the apparatus is actuated by a thermo-couple circuit using either base-metal or noble-metal thermo-couples. The galvanometer and all mechanical parts are standard and interchangeable. The unit feature of the equipment makes it possible to provide multiple control capacity by adding control units to the same power unit. These units to the number of six can be added or removed without disturbing the balance of the equipment.

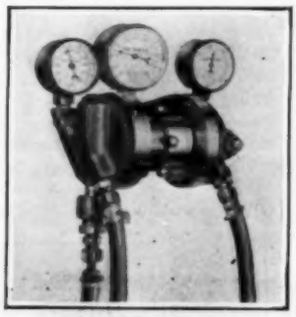
— 226 —

Regulator, Two-Gas, Automatic

Burdette Manufacturing Co., Chicago, Ill. [Vol.61,p. 904.]

This device is designed to produce equal pressures in two gas lines with one hand control, and it is especially adapted for use with oxy-acetylene apparatus. The handwheel at the center of the device is turned in the proper direction to equalize the pressures.

This result is achieved by exerting pressure on the



two controlling diaphragms through the compression of a single coiled spring. There is no possibility for the gases to mix in the regulator, as they flow in independent passages to the mixing chamber in the torch. The device is screwed to the oxygen tank and is connected to a tube leading from the acetylene tank.

— 227 —

Speed Transformer, Spur-Gear, Industrial Type

Hill Clutch Machine & Foundry Co., Cleveland, Ohio. [Vol.61,p.289.]

This speed transformer is intended for use under continuous or heavy-service conditions. It consists of a nest of plain spur gears re-

volving in oil. The gears all have 20-deg. involute-form cut teeth. Both the high- and low-speed shafts are supported in double bronze bearings. Ease of accessibility is obtained, as the cap and both ends can be quickly removed.

The efficient oiling arrangement is a continuous splash system of lubrication, obtained by a metal disk on the high-speed shaft, which automatically lubricates all gears and bearings. The entire unit is inclosed.

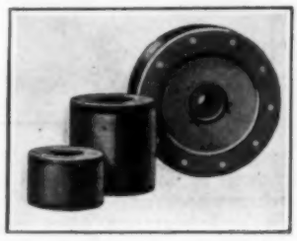
— 228 —

Pulleys, Paper

Best Pulley Manufacturing Co., 400 *Talcott Ave., St. Louis, Mo.* [Vol.61,p.363.]

These pulleys are made of selected, treated paper fiber, hydraulically compressed into a solid block. The end grain of the fiber is exposed to the belt in order to provide a good grip.

The hub is constructed with three sets of double ribs which lock the hub securely in the paper block and prevent it from coming loose.



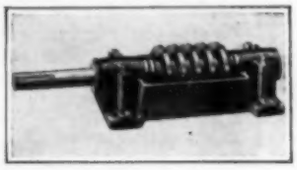
These ribs are designed to hold securely in either direction of rotation. The hub is hydraulically pressed into the pulley. Each pulley is carefully balanced and tested. Approximately 2,500 stock sizes are made.

— 229 —

Worm Box, Double-Thrust

W. A. Jones Foundry & Machine Co., 4401 *West Roosevelt Road, Chicago, Ill.* [Vol.61,p.366.]

This device is for use with open worm-gear drives where something less expensive than a completely enclosed unit must be used. The box is designed to give an accurate and rigid support for the worm shaft and holds a supply of oil in which the worm operates. Three finished thrust washers, one fiber and two of steel, are



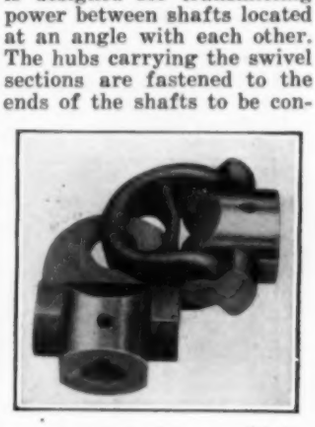
provided at each end of the worm. The bearings are babbitted, bored and faced on the ends. The boxes are made in standard sizes to suit standard steel worms made by this company.

— 230 —

Transmission, Angular

G. M. Bartlett, 2533 *College Ave., Indianapolis, Ind.* [Vol.61,p.596.]

This angular transmission is designed for transmitting power between shafts located at an angle with each other. The hubs carrying the swivel sections are fastened to the ends of the shafts to be con-



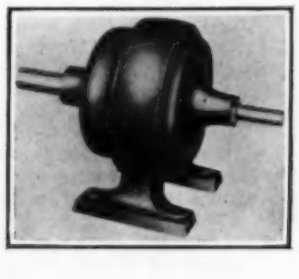
nected. For proper working it is not necessary for the shafts to be precisely in alignment, and the device will also transmit motion satisfactorily between two parallel shafts whose center lines are some distance apart.

— 231 —

Speed Reducer

Meachem Gear Corp., 122 *Dickerson St., Syracuse, N. Y.* [Vol.61,p.632.]

This apparatus is adapted for the transmission of



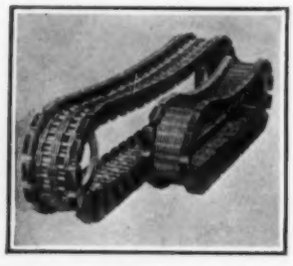
power from high-speed turbines or motors to low-speed machinery. The load is transmitted from the high-speed shaft through plenetary gears to a slower rotating ring. A number of rockers are connected inside the ring and engage a spider keyed to the low-speed shaft. As the driving motor or turbine starts up, the engagement of the rockers with the spider causes each rocker to compress a spring plunger. The load on the turbine or motor is reduced to practically nothing during the time required to compress the springs, this period of time corresponding to about one-quarter of a revolution. The device is furnished in ratios from 4 to 1 up to 200 to 1, and for loads up to 500 horsepower.

— 232 —

V-Belt, Steel-Link

Reeves Pulley Co., Columbus, Ind. [Vol.61,p.672.]

This is the V-belt that transmits the power between the constant-speed and variable-speed shafts in the Reeves variable-speed transmission. In order to secure increased durability and flex-



ibility in this portion of the mechanism a steel-link belt has recently been developed by this company. Its overall dimensions are the same as the rubber-body belt heretofore supplied.

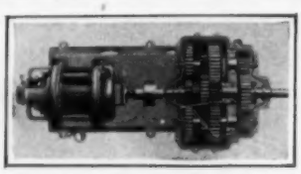
The chain used in the belt is composed of hardened steel links connected by antifriction rocking pins. Leather tabs are cemented and riveted to small steel plates securely fastened to the body of the belt. These leather pieces make contact with the transmission cones and are fastened to the belt at the proper angle.

— 233 —

Speed Reducer

Huron Industries, Inc., Alpena, Mich. [Vol.61,p.789.]

This is a three-shaft, balanced-drive speed reducer. A semi-steel housing incloses the gears, the cover being bolted to the lower section



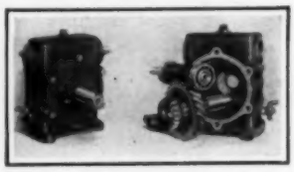
and the joint machined and grooved to prevent loss of oil. An oil compression reservoir is located in the bridge wall and forms part of the force-feed lubrication for the mechanism. Oil is drawn from the casing by a pump that is driven by an eccentric on the low-speed shaft and is forced into the reservoir. From the reservoir the oil passes into the main bearings where it enters the hollow shafts through radial openings. The oil then travels through the shafts and is distributed to the wearing surfaces of all bearings by similar radial holes. For the main bearings in the casing, ring oilers are used.

— 234 —

Reduction Unit, Worm, Size O

Cleveland Worm & Gear Co., Cleveland, Ohio. [Vol. 61,p.1018.]

Available in ratios varying from 5 to 1 up to 30 to 1 this worm reduction unit will transmit loads up to 3 hp. The worm and its shaft are machined from a nickel-steel forging and the worm-wheel is hobbed from a phosphor-bronze casting. The worm threads are hardened, ground and polished, the pressure



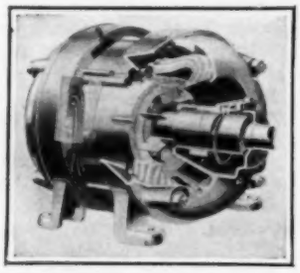
angle being 30 deg. The worm is located above the wormwheel and is mounted in ball bearings of a combined radial and thrust type. The worm wheel shaft is mounted in Timken taper roller bearings. The cast-iron base acts as an oil reservoir.

— 235 —

Motor, Arc-Welded, Type D

Lincoln Electric Co., Coit Road and Kirby Ave., Cleveland, Ohio. [Vol.61,p.442.]

In the manufacture of this series of electric motors the operation of arc-welding plays an important part. The end frames are made by rolling a standard steel angle in the shape of a ring and welding the ends together. The feet are drop forgings and are welded to the angle-steel end frames. The fan blades for the venti-



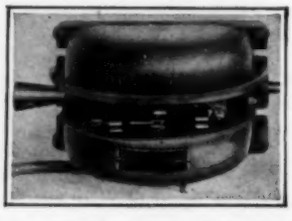
lation of the motor are welded to the rotor. Finally, the copper rods or windings of the rotor are welded to the short-circuiting rings, preventing any loosening or current leakage at this point. The end frames can be hot-riveted together and drawn up very tightly without danger of breakage. In this way the stator laminations are held securely and produce a good field.

— 236 —

Switch, Demagnetizing

Taft-Peirce Co., Woonsocket, R. I. [Vol.61,p.522.]

This company is furnishing with its magnetic chucks a type of demagnetizing switch that automatically demagnetizes the chuck when thrown to the off position. The contact points at one end are sufficiently high for the blades to pass between and beyond them, and be out of contact when the lever reaches its final position. These contacts are so con-



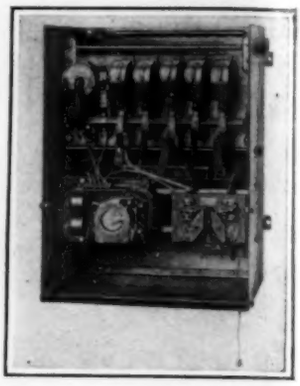
nected that they cause a reversal of the current. The act of throwing over the lever breaks the circuit as the blades leave the low contacts at one end, and reestablishes it momentarily in the opposite direction as they pass between the high contacts at the other end.

— 237 —

Compensator, Starting, Automatic

General Electric Co., Schenectady, N. Y. [Vol.61,p.597.]

This is an automatic starting compensator for squirrel-cage induction motors and is designated type CR-7051-J1. This starter is for the remote control of two- or three-phase motors up to 600 volts, when used in general applications such as driving line shafting, pumps, compressors, conveyors, etc. The motor may be started at a distance by push-button or



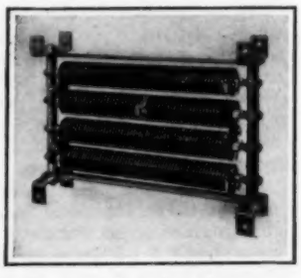
snap switches within convenient reach of the operator or automatically by switches actuated by pressure governor, float switch, thermostat, etc. Definite and adjustable time acceleration is obtained by means of an improved induction-type relay. Positive overload protection of the complete equipment is furnished by a double-pole, inverse-time, temperature relay.

— 238 —

Resistor, Edge-Wound

Monitor Controller Co., Baltimore, Md. [Vol.61,p. 903.]

This is a ribbon-type resistor with the ribbon wound on edge and is intended for service where cast-iron grids would otherwise be employed.



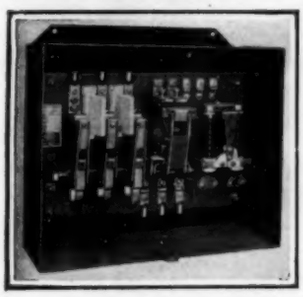
The unit consists of a high-resistance alloy ribbon wound in helical form on a steel-reinforced porcelain support. A system of terminals and taps permits the connection of a unit in a circuit or its interconnection with other units. Two simple forms of clamps are used for this purpose. The resistors are made in standard units and are mounted in frames.

— 239 —

Starter, Induction Motor, "Thermaload"

Monitor Controller Co., Baltimore, Md. [Vol.61,p.1017.]

The "Thermaload" starter is designed to protect an induction motor against light overloads dangerously prolonged although it permits the carrying of heavy overloads momentarily. Heat



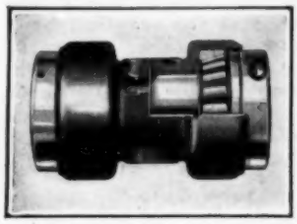
produced by the thermal elements under overload causes expansion of a confined liquid which operates an arm containing two contacts controlling the operating circuit. Changes made since the device was described in Vol. 56, *American Machinist*, consist of the use of standard instead of special side-arm contactors and hair-pin-shaped thermal elements instead of the coiled elements previously used. The thermal elements are interchangeable.

— 240 —

Bearing, Hanger, Roller, Dodge-Timken

Dodge Manufacturing Corp., Mishawaka, Ind. [Vol. 61,p.403.]

This lineshaft bearing embodies Timken tapered roller bearings and special attention has been paid to secur-



ing ruggedness, simplicity, interchangeability and freedom from lubrication troubles.

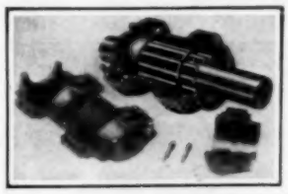
The complete bearing has only five parts, and consists of two Timken tapered roller bearings mounted on a ground and slotted steel tube and fitted into an accurately machined housing. The ends of the tube are threaded to receive clamping collars, by means of which an accurate adjustment of the bearings on the tube is obtained. The mounting allows the bearing to function properly under both radial and thrust loads.

— 241 —

Bearings, Roller

Chandler Machine Co., Ayer, Mass. [Vol.61,p.522.]

This line of roller bearings is especially adapted for use in line and counter shafting. A feature of the bearing is the split construction. A series of rollers are spaced around the shaft by means of two split steel rings. The ends of the rollers project into two load collars that are also split and provided with grooves at the center into



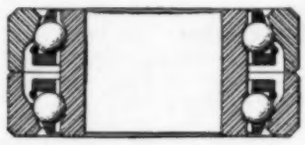
which the spacing rings fit loosely. Trunnions on the load collars locate them in the housing of the bearing and permit them to adjust themselves to the alignment of the shaft. A series of twelve sizes is available for shafts from $\frac{1}{8}$ to 4 in. in diameter.

— 242 —

Bearing, Ball, High-Speed

Ex-Cell-O Tool & Manufacturing Co., 1469 *East Grand Blvd., Detroit, Mich.* [Vol.61,p.597.]

This high-speed ball bearing is licensed under the Snader patent application. The bearing is of the combined radial and thrust type and is designed for speeds up to 50,000 rev. per minute. The ball races are so located in relation to each other that the balls are given a spinning motion in addition to



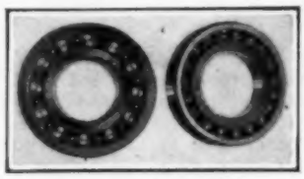
the motion of rolling around the center of the shaft. Since the outer races are at an angle, a worn bearing can be salvaged by grinding the inside faces of the outer rings. If the surfaces of the races are excessively pitted or worn, these surfaces can be reground. Bakelite ball separators are used.

— 243 —

Bearings, Disk and Ball, NKA

Wollmar Engineering Corp., 224 *East 42nd St., New York, N. Y.* [Vol.61,p.864.]

This line of disk and ball bearings is made in Gothenburg, Sweden. These bearings are shown in the accompanying illustration, the disk type appearing at the right and the ball bearing being shown at the left. The rolling disks in the disk-type bearing have contact surfaces that are elliptical in cross-section, and the contour of the races in which the disks run is also elliptical. The curvatures of the disk surface and the surface of the race are so proportioned that the bearing of the disk is comparatively wide, but the pressure at



the edge of the contact surface is very small. This design provides a bearing with high load capacity and obviates the tendency sometimes found in ordinary roller bearings for the rolling surface to break down at the edges. The design of the contact surfaces also causes the disks to be self-guiding. The ball bearing is of conventional design with the exception of the ball separator employed.

— 244 —

Bearings, Ball, Lubricated

Standard Steel & Bearings, Inc., Plainville, Conn. [Vol. 61,p.1016.]

Intended primarily for use in the clutch pilot position of automobiles, this bearing is equally applicable for use in other places inaccessible to lubrication. A sheet steel retainer is expanded by a

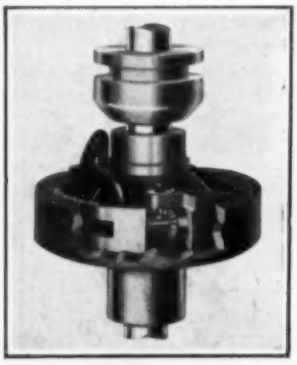
pressing operation into a groove in the outer ring to keep one side of the bearing oil tight. When the bearing is assembled into a machine, it is packed with a suitable grease and the open side is placed toward the blank end of the recess.

— 245 —

Clutch, Expansion, Unit, CMT

Conway Clutch Co., 1956 *W. Sixth St., Cincinnati, Ohio.* [Vol.61,p.674.]

The features of this device are a self-contained friction unit, accessible adjustment with wide range, large peripheral contact and full-length bearing for the loose member. The friction unit carries an adjustable latch, with which a bent lever makes contact and causes the friction unit to expand when the lever is operated by means of the usual type of sliding cone.



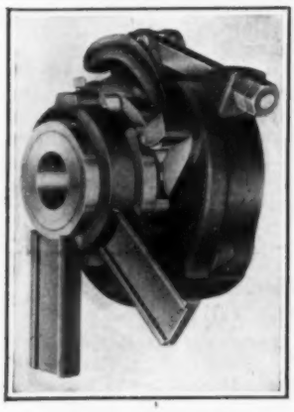
The clutch is adjusted by turning the squared shaft to which the pinion of the latch mechanism is attached. The device is manufactured in sizes from 6 to 12 in., with a power range up to 25 hp. at 100 r.p.m. Clutch pulleys can be furnished in all sizes up to and including 24 in. in diameter.

— 246 —

Clutch, One-Revolution

Conway Clutch Co., 1956 *W. Sixth St., Cincinnati, Ohio.* [Vol.61,p.713.]

This is a friction clutch that will make one revolution and stop when tripped. The arm that operates the friction unit carries a cam roller at its outer end. The roller contacts with two cams. Each cam has a notch in its periphery and the clutch arm moves to the stop position when the notches of the cams are together. The outer cam remains stationary and the inner one is controlled by a



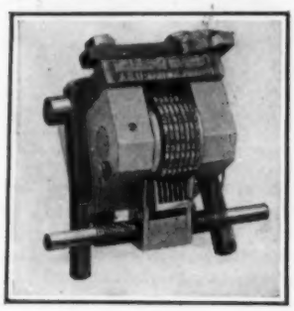
treadle or other mechanism. When the treadle is released the inner cam moves to the stop position, and the clutch is released at the completion of the next revolution. If the treadle is held depressed, the clutch continues to turn. Five sizes of the clutch are made, with transmission capacities from 1 to 25 hp. at 100 r.p.m.

— 247 —

Numbering and Marking Device, Automatic

Noble & Westbrook Manufacturing Co., Hartford, Conn. [Vol.61,p.479.]

This machine is designed for use in numbering cylindrical parts and will, in addi-



tion, mark names, trademarks, etc., on these parts at the same operation. The parts to be numbered are carried on a suitable holding fixture on the table of the marking machine to which the device is attached and are automatically rotated into position. For ordinary changing of the numbers a hand lever can be depressed to give the next higher number. The device illustrated is furnished with a lever that strikes a fixed point on the holding fixture and automatically advances the numbering dies to the next higher number. This arrangement makes the device adaptable for the serial numbering of a variety of cylindrical parts. The trademark and name-marking features are of advantage.

— 248 —

Numbering Machine, Metal, Model P-2

American Numbering Machine Co., Atlantic and Shepherd Aves., Brooklyn, N. Y. [Vol.61,p.672.]

This improved model of numbering machine is like the model P-1, previously described on page 306, Vol. 60,

of the *American Machinist*, except that it is fitted with semi-automatic means for setting the number wheels. The setting is accomplished by depressing the pivoted handle shown at the front of the device in the accompanying illustration. For consecutive numbers the handle is depressed after each number is made. The number is imprinted by placing the machine on the work and striking the shank a blow with a hammer.

— 249 —

Babbitt, "Diesel Marine"

United American Metals Corp., Diamond St. and Meserole Ave., Brooklyn, N. Y. [Vol.61,p.169.]

This babbitt is made according to government specifications for use in the Diesel and other types of internal combustion engines. The material is alloyed by the Stanley process, in which the ingredients are separately melted and continuously agitated for 24 hours. This keeps the tin within the proper temperature and insures homogeneity.

— 250 —

Grease Cup, "Hex-Top"

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill. [Vol.61,p.211.]

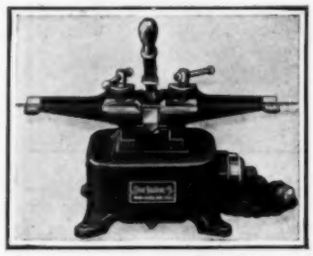
To get away from the difficulties encountered in handling grease cups with cylindrical tops, this company has brought out this hexagon top for its standard grease cups. The top can be turned down by means of an ordinary wrench or by hand. It is also provided with a screwdriver slot for use when it is inaccessible to hand or wrench.

— 251 —

Brazer, Bandsaw, "Vulcan"

Oliver Machinery Co., Grand Rapids, Mich. [Vol. 61,p.213.]

The heat for brazing is available on this machine by simply turning a switch and the consumption of current is insignificant. Over a hundred narrow bandsaw brazes have been made with one kilowatt-hour. The operator need not be especially skilled.



The brazing process can be fully observed and controlled, the heat being constantly modified by the switch referred to above.

The outfit comprises a transformer, the main coil of which is connected to a power or light circuit by means of a switch and the secondary coil of which serves as a clamp for the ends of the saw which are held rigid by two screw clamps, a hand-operated hawkbill or center clamp, a switch and cord for lamp socket connection. The machine illustrated is for bandsaws up to 1¼ in. wide. Machines for wider work are also built. They can be used on either a 110- or 220-volt circuit.

— 252 —

Fan, Man-Cooler

Buffalo Forge Co., 490 Broadway, Buffalo, N. Y. [Vol.61,p.252.]

This fan is made in two sizes having fan wheels of 30 and 36 in. respectively. The wheel has ten blades, so designed as to deliver the air in a solid stream, and is enclosed in a substantial screen. Power is supplied by a direct-connected motor at the rear of the fan wheel, the motor for the 36-in. fan being 3-hp., while that for the

30-in. fan is 5-hp. The speed for both sizes is 900 r.p.m.

— 253 —

Foreman's Desk or Mailing Table, All-Steel

Angle Steel Stool Co., Plainwell, Mich. [Vol.61,p. 252.]

This table is made entirely of heavy steel, the parts being riveted together and braced to withstand strain

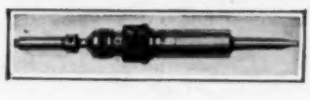
and heavy loads. The table-top is 30 in. from the floor and carries a sorting top or compartment section. Each compartment is 10 in. wide by 15 in. deep by 3 in. high, and all compartments are closed at the rear end by a sheet metal back. The working-space on the table-top in front of the compartment section is 18x40 in. The table is finished with a dark-green enamel.

— 254 —

Attachment, Screwdriving and Nut-Setting

N. A. Strand & Co., 5001-5009 N. Lincoln St., Chicago, Ill. [Vol.61,p.252.]

This device is intended for use in the drill press for driving screws and setting



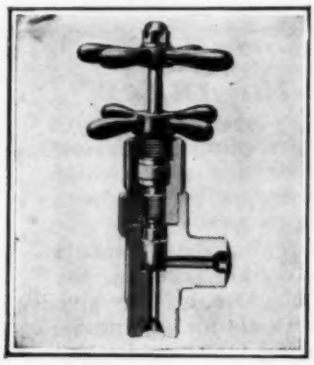
nuts. It has a spring-clutch drive and is provided with a friction adjustment for the proper tension. It is furnished with either a socket wrench or a screwdriver, and is made in three sizes fitted with standard taper shanks. Special shanks can be furnished if desired.

— 255 —

Valve, Manifold, Oxygen

Oxweld Acetylene Co., 30 East 42nd St., New York, N. Y. [Vol.61,p.289.]

This manifold valve is designed for satisfactory operation under the high pressures commonly used in oxygen tanks. The body of the valve has a formed seat into which the stem tip is pressed when the valve is



closed. The tip is attached to the stem by means of a swivel joint, so that it is free to seat itself naturally in the body. The stem screws into the inner end of a stuffing-box that is seated on a lead gasket to provide a gas-tight joint. Leakage around the stem is prevented by rubber packing compressed between two packing rings by means of a hand-wheel and nut. The valve is so designed that the internal parts will not be blown out.

— 256 —

Axle Stand, Universal, Model F

Weaver Manufacturing Co., Springfield, Ill. [Vol.61,p. 479.]

This device is designed to hold solid as well as split axles. The jaws at the left-hand end of the stand are universally adjustable

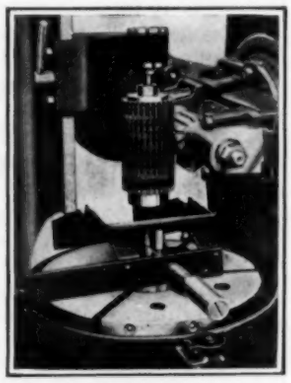
and will hold the work in the most convenient position for performing the work that is to be done. The supports at the right-hand end of the stand are provided for the drive shaft and are adjustable for height and angle. A tool tray is located between these supports and the arm on which it is fastened can be rotated into the most convenient position. This arm also carries a transverse rod for supporting radius rods.

— 257 —

Mandrel, Quick-Loading

Gould & Eberhardt, Newark, N. J. [Vol.61,p.519.]

Inasmuch as the removal of finished fiber gears from a gear cutter and the loading of blanks usually requires more time than the actual cutting of the teeth, Gould & Eberhardt, Newark, N. J., have recently developed a quickly removable mandrel for use on their gear hobbing machines. In connection with the mechanism for removing the mandrel quickly from the machine, two mandrels are used so that the operator can be un-



loading and reloading one while the cutting is being done on the blanks held by the other in the machine.

To release the mandrel, the handle near the lower end is given a sharp blow with the hand. A ring, which serves as a wedge under a shoulder on the arbor, is raised by the movement of the handle, thus releasing the mandrel from the spindle. The work support is then raised, the mandrel is removed, and the loaded mandrel is seated on the taper stud. The machine is then ready to start, after the work support is lowered. The device is, of course, adapted for the cutting of small gears from any material. In the illustration the machine is engaged in cutting the teeth on fiber speedometer gears.

— 258 —

Heating Machines

Gibb Welding Machines Co., Bay City, Mich. [Vol. 61,p.555.]

These machines are for heating materials by electricity preparatory to soldering, brazing or welding. The part to be soldered, brazed, or welded is placed between the contact points, and the current is allowed to flow until the proper temperature of the material is obtained. A six-point switch is provided to regulate the heat in accordance with the requirements of the work being done.

These machines are especially built to suit the work. The machine illustrated was designed for use in brazing a flange on a tube. Another machine is for the heating

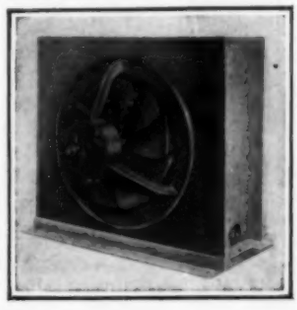
of metallic screen frames for the purpose of flowing solder the entire length of the frame into the corner where the metal strip ends meet.

— 259 —

Heater, Unit, "Breezo-Fin"

Buffalo Forge Co., Buffalo, N. Y. [Vol.61,p.595.]

This apparatus has been developed for heating machine shops, garages and other industrial establishments where steam or hot water is available for heating purposes. The component parts of the device



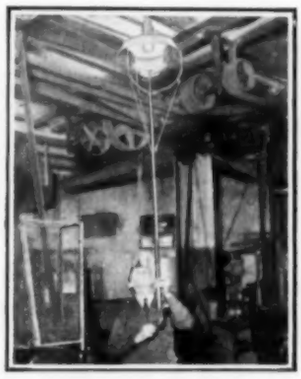
are a series of heater tubes, a unit casing, a fan and a motor. The heater tubes are of copper and are wound with a copper ribbon to increase the radiating surface of the coils and give rapid transmission of the heat to the air. The heating unit is designed for operation on any pressure up to 50 lb. per sq. inch. A low-speed motor operating at 850 r.p.m., or a motor to run at 1,150 r.p.m., can be supplied. The slower speed is used only when very quiet operation is desired.

— 260 —

Cleaner, Electric Light and Reflector

Electric Light & Reflector Cleaner Co., Appleton, Wis. [Vol.61,p.674.]

This is a hand-operated mechanism for cleaning electric lights and reflectors that are located far from the floor. The cleaning is done by the operator while standing on the floor. The handle at the bottom raises the mechanism into contact with



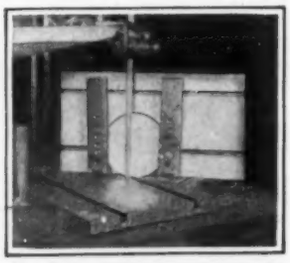
the reflector and lamp, while the lever at the side of the handle holds the brushes against the surface to be cleaned. The crank at the bottom revolves the brush mechanism. Twelve lengths are manufactured to accommodate heights from the floor varying from 7 to 25 ft. Each machine has a 2-ft. height variation to increase its adaptability.

— 261 —

Angle-Plate, Adjustable, for Bandsaw

E. C. Atkins & Co., Indianapolis, Ind. [Vol.61,p. 713.]

This adjustable angle-plate is for use in connection with the Atkins No. 3 metal band-sawing machine. It is intended primarily for use in tool rooms, stockrooms, steel shops, etc., where metal is



to be cut at various angles. The device consists of a base-plate having a working surface of 12 x 20 in., and a 10 x 20-in. angle-plate, fixed in a vertical plane with relation to the base-plate but capable of being adjusted and clamped at any angle in the horizontal plane.

— 262 —

Bench Top, Armored

R. G. Haskins Co., 516 West Monroe St., Chicago, Ill. [Vol.61,p.749.]

The material of which this bench top is constructed consists of a laminated wood

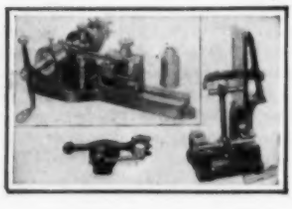
core to which a sheet of 16-gage galvanized steel is glued by a patented process. The wood core is about 1½ in. thick. The steel plate is extended at the front and bent down to protect the edge. These bench tops are marketed in 7-ft. lengths, 30 in. wide, and can be furnished with or without backs.

— 263 —

Tools, Conditioning, Connecting-Rod, F-J

Foster-Johnson Reamer Co., Elkhart, Ind. [Vol.61,p. 750.]

These tools are especially for use in garages and repair shops and include a reboring fixture, a piston aligner, and a vise for bending and straightening the rod. The reboring fixture is



shown in the upper left-hand corner of the accompanying illustration and uses a hand-operated boring bar for finishing the crankpin hole in the rod. The piston aligner is shown at the right of the illustration. The rod is held on a special arbor, the ends of which are ground and rest in Vees in the body of the device. The third tool is a straightening vise. It has a screw that acts on a line between two fixed points on the base.

— 264 —

Bushings, Jig, Standard

Ex-Cell-O Tool & Manufacturing Co., 1469 East Grand Blvd., Detroit, Mich. [Vol.61,p.751.]

This company has recently brought out a standard line of liner, plain and slip bushings for drill jigs. The range of sizes carried in stock is sufficient for drills from No. 55 to 2 in. in diameter. Each size is made in a variety of convenient lengths.

The heads of the bushings are designed for easy removal and are sufficiently small in diameters to permit the use of short center-to-center distances. Holes as

small as ⅛ in. in diameter are ground accurately to size, the smaller holes being finished by lapping.

— 265 —

Belt, Suction, "Tentacular"

Alexander Brothers, Inc., 14 South St., Philadelphia, Pa. [Vol.61,p.979.]

This is a special type of leather belting. The outside consists of oak-tanned leather

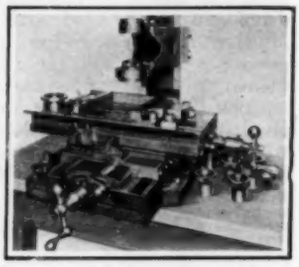
and the inside is composed of narrow longitudinal strips of soft and spongy chrome-tanned leather. The strips are held in position by means of hollow brass rivets which form depressions or pockets in the soft leather. These pockets, it is contended, act as suckers, causing a closer adhesion of the belt to the pulley.

— 266 —

"Locator," Hole

National Tool Engineering Co., Cincinnati, Ohio. [Vol. 61,p.1918.]

The National "Locator" can be used on upright drills, vertical millers, horizontal millers with vertical spindle attachment or horizontal boring machines for the accurate location and placing of holes for drilling, boring, reaming and tapping jobs. The device consists of a



base, saddle and table, column, bushing holder and vise jaws. Measuring blocks, micrometer or vernier are used in locating the various holes. The drill bushings all fit the same liner as they are of the same outside diameter. The appliance is made in five sizes, four regular and one special, ranging from 4x6 in. to 20x36 in. and from 85 to 560 lb. in weight.

How to Use the Index

THE contents page preceding the review pages is useful for locating a particular type of machine or appliance, the products being grouped according to type.

If it is desired to find what developments have been made by a certain concern, the following pages will be of value, as they give an index of the manufacturers for whom new products have been described in the *American Machinist* during the past six months. The index serves to show the activities of manufacturers in bringing out new products, as it offers a résumé of the developments.

In the index, the names of the manufacturers are placed in alphabetical order, and under the name of each can be found the product or products treated in the review pages. The number of the page on which the story appears is given to aid in finding the location of the article. The number of the item is placed after each product.

Looking over a few new machines or tools from week to week does not give one the perspective of the development of the machine tool. On the other hand, looking at all the things brought out in the last half year does give such a perspective. Developments come rapidly nowadays and a half year is time enough to indicate the trend. The Shop Equipment Review is the ready means of comparing and recording them. It is not a substitute for the Shop Equipment News Section or the advertising pages but a periodical compilation of the information contained in them.

The condensed descriptions and illustrations are intended to give the reader a good general idea of each product. For further details the description appearing in Vol. 61 of the *American Machinist* on the page referred to at the head of each item should be consulted.

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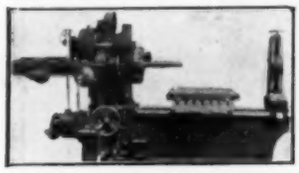
Boring and Turning Machines

— 1 —

Boring Machine, Horizontal

H. W. Kearns & Co., Ltd., Broadheath, England. [Vol. 61,p.41E.]

These machines are built in No. 1, 2 and 4 sizes and have automatic facing chucks and independent travelling



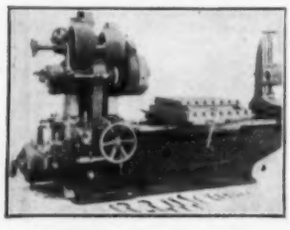
spindles. The latter are respectively 2½, 3 and 4 in. in diameter, and the machines have maximum facing capacities of 24, 30 and 54 in. The No. 2 size is shown with screw-cutting gear at the left-hand end of the bed. All are arranged for individual motor drive and are driven by constant-speed direct current motors, running at 750 r.p.m. Boring and facing can be carried on simultaneously if so desired. Special features embodied are metroscopes, locating and securing arrangement for the revolving table, and attachments for flange drilling, grinding, gear-cutting and taper boring making the machine unusually adaptable.

— 2 —

Boring Machine, Horizontal, Pearn-Richards

George Richards & Co., Ltd., Manchester, England. [Vol.61,p.48E.]

The facing head of this No. 2 facing, boring, milling, drilling and tapping machine has a capacity of 24 in. It has automatic feeds to the table longitudinally and transversely, also to the spindle frame vertically, with



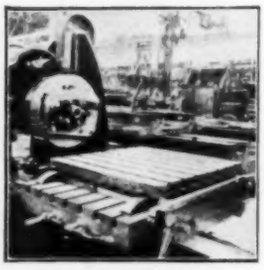
rapid power traverses to these motions. The bed is of box section, with control levers for all parts on the front, the change-speed gearbox being outside the bed. Thirty-two speeds are available, ranging from 3.8 to 200 r.p.m. Sliding gears in the gearbox are controlled by two levers which give four speeds, and by changing the starting lever to the right or left two other speed changes are provided, making eight in all. The facing head has a vertical adjustment above the revolving table of 4 to 23 in., and above the sliding table of 8 to 27 in. The sliding table is 43x30 in., and the square revolving table of 30-in. side. The traverse with the boring stay in position is 42 in. longitudinal and 32 in. cross.

— 3 —

Boring Machine, Horizontal, Improvements

George Richards & Co., Ltd., Manchester, England. [Vol.61,p.66E.]

The improved machine has two tables, the upper of which is a detachable turn-table moving on a central pin, and raised from and lowered on to the main table below by means of a small lever. The upper table may be set in four right-angle positions by



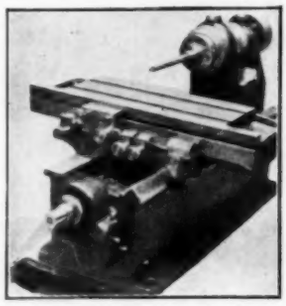
means of a quartering stop and also in the latest machine by a patent wedge device. The upper table is square, and the lower table, sliding on the saddle, is rectangular. Another patented device has been applied to machines fitted with the screw - cutting attachment, and provides independent adjustment for use when putting on the cut. By its means axial adjustment is given on either side of the thread. For this the nut on the main screw in the bed is rotated by a pinion.

— 4 —

Boring Machine, Precision, Small

Smith & Coventry, Ltd., Manchester, England. [Vol. 61,p.144E.]

This machine is for producing holes from ½ to 1¼ in. in. diameter by 3 to 5 in. in length, which require to be very accurately spaced center to center and in one plane. A lower slide moves the length of the bed on long guides, this movement being by screw and friction feed at about 200 cuts per inch. The slide traversing on the bed carries a work table, movable, by hand only, at right angles to the center line of the machine. It can be clamped through the medium of a flexible strip attached to the table in such a manner that clamping does not



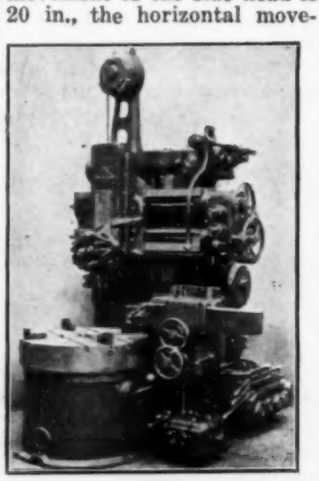
disturb in any way the fit of the table on its slide. Endwise movements of the table, as stated, are made directly by hand. Accurate settings of the table are made by the use of gage rods. The single-point method of cutting is used, the cutters of Stellite being carried in changeable projecting bars.

— 5 —

Boring and Turning Mill, with Turret and Side Head

Webster & Bennett, Ltd., Coventry, England. [Vol.61, p.26E.]

This machine will admit work 38 in. in diameter by 35 in. high under the main head turret or 27 in. high under the cross-slide. The vertical feed of the turret is 25 in. and the horizontal feed of turret, table center outwards, is 21 in. The total vertical movement of the side head is 20 in., the horizontal move-



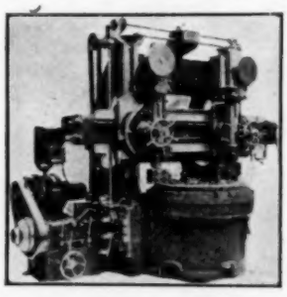
ment of the ram being 20 in. The chuck has four hardened, independent, reversible jaws. The machine is driven by a single-pulley through gearbox, the 12 speeds being in geometrical progression and interlocked. Control levers are grouped at the front of the machine and the gears cannot be changed until the driving pulley is de-clutched. This action automatically controls the brake. The 12 feeds for the main turret are vertical, horizontal and angular, and the 12 side head turret feeds are vertical and horizontal, both sets of feeds being positive. Feed trips are fitted to the main turret head. Rapid power traverse is available in all directions for the main turret slide and is controlled and interlocked with the positive feeds by lever motion. Power elevating motion is provided for the main cross-slide, with conveniently located control.

— 6 —

Turning and Boring Mill, Vertical, 48-In.

Smith & Coventry, Ltd., Manchester, England. [Vol. 61,p.47E.]

This machine has a table 44 in. in diameter and will admit 30 in. under the tool-



holders or 36 in. under the cross-slide. The table spindle runs in a cylindrical bearing with adjustment for wear, and the table is supported on an annular surface on the bed, forming an oil-submerged bearing. The machine-cut gear ring is driven by a forged steel pinion from a 12-speed gearbox by 10-hp. constant-speed motor. A traversing rack is cut in each bar, the traverse being 18 in. The bars can be swivelled for angular turning and have feeds ranging from $\frac{1}{32}$ to $\frac{1}{8}$ in. per revolution of the table in both directions, the changes being made by means of a feed gearbox in which multiplying of speeds for the fast feeds is avoided as far as possible. Quick power traverse at 48 in. per min. can also be applied to any of these movements. The feed mechanism is indepen-

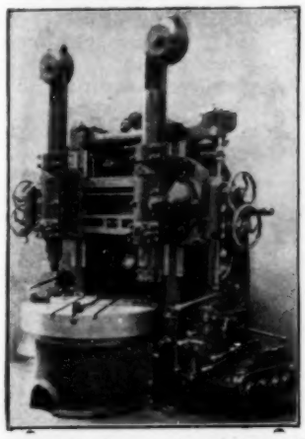
dent for each tool bar, and provision is made for using change gears for cutting threads.

— 7 —

Boring Mill, 42-In., Double-Head

Webster & Bennett, Ltd., Coventry, England. [Vol.61, p.60E.]

The tool bars of this machine are made from steel forgings and are balanced by compensating springs. Twelve reversible feeds are



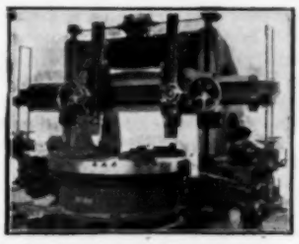
provided for each head and are available in vertical, horizontal and angular directions, the screws and worms having ball thrust bearings. Safety devices prevent damage to gears, and all feeds are interlocked. Hand adjustments are made by large handwheels permanently locked to the shafts and screws. The rapid power traverse of the slides is available in all directions and controlled and interlocked with the feeds by lever motion. All gears are of steel or phosphor-bronze, and the bearings are lubricated by filtered oil. The machine admits work 45 in. in diameter and 25 in. long under the toolholder. The vertical feed of the tools is 22 in. Twelve feeds are available. The driving pulley is 16 in. in diam. for a 4-in. belt.

— 8 —

Boring Mill, Vertical, 100-In.

J. Stirk & Sons, Ltd., Halifax England. [Vol.61,p.62E.]

This machine is driven by a 25-hp. variable-speed motor, and its features include a patent quick power traverse and cross slide elevating motion by pendant switch, and selector switches to engage the desired mechanism, while the spring balance of the ram has been improved and fine hand adjustments



from two positions are provided for each head. With a variable-speed motor and three main gears a continuous variation of table speed from 0.75 to 30 r.p.m. can be obtained. If alternating current is available a constant-speed induction motor may be employed with six-speed gear-box, thus providing 18 table speeds. Supplementary motors of 2½ hp. controlled by pendant switch provide quick power traverses to the head and also the elevating motion to the cross-slide.

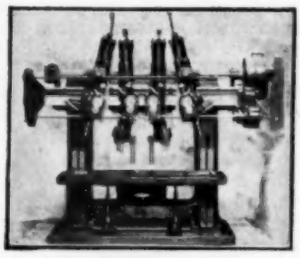
Drilling Machines

— 9 —

Gang Drill, Adjustable-Head, Four-Spindle

J. Archdale & Co., Ltd., Birmingham, England. [Vol. 61,p.24E.]

This machine has been specially designed for drilling swivel-pin and spring-pad holes in automobile front axles. The table is 15x69 in. on top and is adjustable vertically. On a horizontal slide



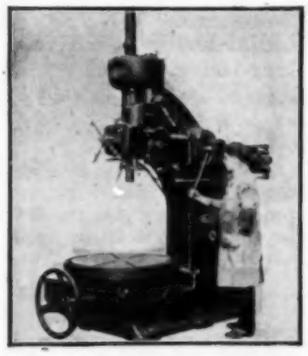
are four drilling heads, the two outer heads being arranged for swivelling, to drill inclined holes on front axles, if required. The spindles are driven by helical gearing and have six keys machined out of the solid. A lever-controlled clutch on each spindle enables either to be thrown out of action if necessary, and an interlocking device prevents the engagement of feed for any head unless the spindle clutch is engaged. The minimum center distance of adjacent spindles is 7 in., the maximum distance between the outer spindles being 54 in. Each head has an automatic stop motion so that any spindle may be fed independently or all may feed simultaneously, but they cannot be engaged simultaneously. The feed is through pulleys and change gears, four rates being provided, and suitable quick-change speed and feed boxes are provided. The maximum drilling capacity is four 1¼-in. holes; the machine will drill four ¾-in. holes at 5½ in. a minute.

— 10 —

Drilling Machine, Vertical

W. Asquith, Ltd., Halifax, England. [Vol.61,p.48E.]

This vertical drilling machine will admit work 48 in. in diameter. It has a spindle 2⅜ in. diam. in the driving part, with 18 speeds ranging from 27 to 405 r.p.m. The four feeds range from 120 to 35 cuts to the inch. The spindle end has a No. 5 Morse taper and a traverse, both hand and self-acting, of 15 in. The table is 42 in. in diameter and has a traverse of 25 in. A motor is mounted on a bracket at the back of the foundation and drives a gear box through a silent chain. The machine may



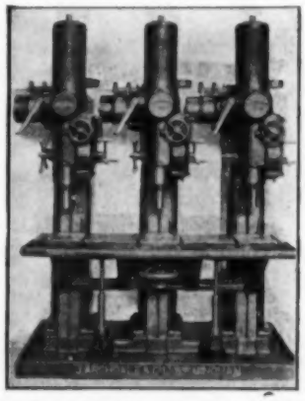
also be belt-driven. The work table traverses on a box foundation under the spindle and can be rotated by hand through a complete circle. Both longitudinal and rotary motion are locked by a lever on the right-hand side of the bed. No table elevating motion is provided. The gear box is mounted on the main column, with the controls.

— 11 —

Drill, Vertical, 3-Spindle, Manufacturing

J. Archdale & Co., Ltd., Birmingham, England. [Vol. 61,p.59E.]

This apparatus consists essentially of three separate machines, arranged in gang form with a common worktable so that it can be controlled by one operator. Each head is individually driven, providing suitable speeds for drilling holes of various sizes in one piece or to obtain reaming speeds. The machine illustrated has the spindles arranged at center distances of 26½ in., the table top measuring 15x69 in. Each head is driven by a constant-speed belt, speed variations being obtained from change gears. The speeds range from 66 to 265 r.p.m.,



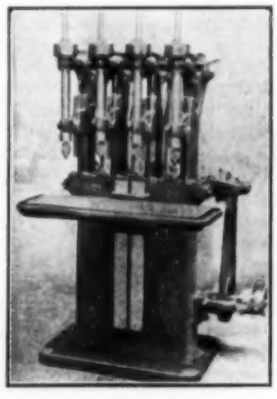
each pair of gears providing two spindle speeds. The spindle traverse is 10 in., the distance from the spindle to the body also being 10 in. The maximum distance from the spindle to the table is 28 in. Four feeds are available, controlled by levers and engaged by a friction clutch.

— 12 —

Drills, Sensitive, Precision, High-Speed

F. Pollard & Co., Ltd., Leicester, England. [Vol. 61, p.17E.]

The complete line of these high-speed, ball-bearing, precision sensitive drills, includes machines with one, two, three and four spindles, for bench and column. The illustration shows a four-spindle machine. The spindles each have six speeds and



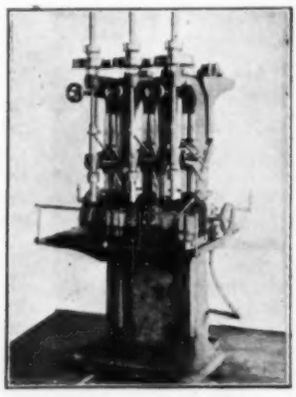
the column machines have balanced rising and falling tables. Supplementary countershafts are provided, and with these running at 1,200 r.p.m. the six spindles speeds range from 1,440 to 10,080 r.p.m. In each case the vertical movement of the spindle is 3 in., while the vertical movement of the bracket in the bench machine is 5½ in., and in the column machines 6 in. The table of the latter has a vertical movement of 22 in., and the maximum distance between the end of the chuck and the table surface is 31 in. The special features of the machines are the mounting of the ball-bearing spindle and the flat belt drive, both important where a speed of 10,000 r.p.m. is required.

— 13 —

Drill, Sensitive, Three-Spindle

Jones & Shipman, Ltd., Leicester, England. [Vol.61, p.57E.]

This machine is fitted with ball bearings throughout. Holes up to 1¼ in. in diameter can be drilled. Power is transmitted from a countershaft carried on the column at the back from three-speed cone pulleys to a two-step cone pulley on the spindle. Thus six speeds ranging from 494 to 2,618 r.p.m. can be obtained, the changes being obtained by cam action and screw, a small handwheel at the front of each head



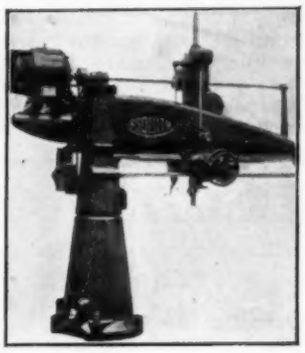
adjusting the belt to the required tension. The feed with the quill is 6 in. and the sliding head has a vertical adjustment of 11 in., the vertical adjustment of the table being 21 in. The maximum distance from spindle nose to table is 32 in.

— 14 —

Radial Drill, Girder, Central-Thrust, Improved

W. Asquith, Ltd., Halifax, England. [Vol.61,p.19E.]

The improvements made in this machine consist chiefly of a motion by which the arm is locked against radial adjustments and the saddle against movement along the arm. At the same time the self-acting feed to the spindle



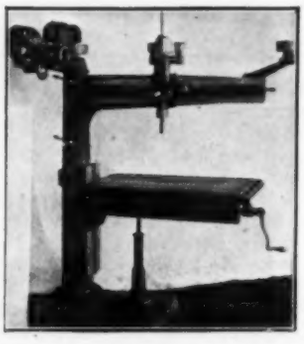
is applied. When the drill point has been adjusted down to the work, the movement of a lever on the saddle performs all these operations simultaneously. The machine is thus properly locked while drilling and the tendency to breakage of twist drills is reduced, while the drilling output is improved. The machine has a maximum radius of spindle of 6 ft., the height admitted from the underside of the spindle nose to the level of the pillar base, with spindle in top position, being 51 in. The spindle nose is bored to No. 4 Morse taper.

— 15 —

Radial Drill, Sensitive, Gear-Drive, 36-In.

Jones & Shipman, Ltd., Leicester, England. [Vol.61, p.20E.]

This machine is available in two sizes, with maximum spindle center distances from the slide face of 24 or 36 in., respectively, the correspond-



ing minimum being 4 in. in each case. The arm is of semi-tubular section and swings on the column through an arc of 180 degrees. The spindle carriage is gibbed to the arm, with adjustment for wear, and is moved along its length by a steel rack and pinion. The table is gibbed to the slide on the column, and is adjusted vertically by a telescopic screw and handwheel, with a locking device. The spindle diameter in the quill is 1 in., and the quill is 1⅝ in. in diameter. The distance from the spindle nose to the table is 28 in., maximum, and 6½ in. minimum, the width of the table in each size of the machine being 21 inches.

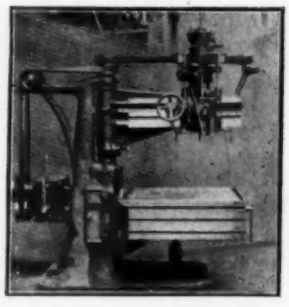
The vertical adjustment is 16½ in. The feed with the quill is 5 in. With ball bearings the four spindle speeds range from 508 to 1,418 r.p.m.

— 16 —

Radial Drills, Sensitive and All-Geared

F. Pollard & Co., Ltd., Leicester, England. [Vol.61, p.53E.]

This is a ball-bearing heavy sensitive radial drill which is made in two sizes, namely, 36-in. and 48-in. radius. The vertical adjustment of the spindle is 6 in. and of the head, 8 in., the vertical adjustment for the table being 12 in., and the maximum distance from the spindle to table, 26 in. In the 36-in. machine the table measures 34x26 in., and in the larger machine 46x26 in. The maximum distance from the base of the column to the center of the spindle is 31½ in. and 43½ in. respectively. In general design this machine is very similar to a line the firm have made for a considerable time, but re-



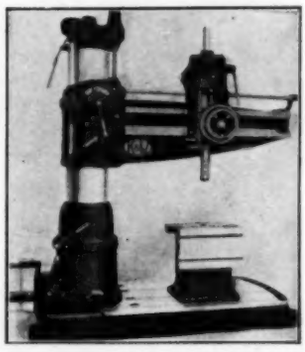
cently certain improvements have been effected, such as a ball-bearing arm, friction feed, change speed and reverse mechanism on saddle, etc. This model is entirely belt-driven, all working parts are mounted on ball bearings, and it is designed to run at high speeds to drill holes up to 1¼ in. in diameter. It is made with gear box drive or with improved countershaft drive. In either case eight spindle speeds are obtainable, the range being from 104 to 1,148 r.p.m. An all-geared model is also made.

— 17 —

Radial Drill, Heavy, 54-In.

Kitchen & Wade, Halifax, England. [Vol.61,p.66E.]

This machine is self-contained and has double gear located on the saddle. The reverse motion for tapping and studding provides quick backing out at four times the drilling speed. The belt-shifting device can be operated by hand or foot lever, and power elevating and lowering motion is provided, with safety devices. The machine is of sufficient capacity for drilling holes from the solid up to 2½ in. in diameter in cast iron, and 2 in. diameter in steel. The



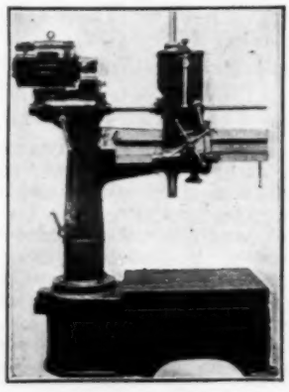
maximum radius of the drill spindle is 55 in., the travel of the saddle along the arm being 40 in. The maximum distance from the spindle to the baseplate is 55 in., and the vertical power adjustment to the arm is 24½ in. The eight spindle speeds range from 30 to 500 r.p.m. and three feeds are provided. All driving wheels are steel forgings, heat-treated.

— 18 —

Radial Drill, 42-In., Improved

Scott Bros., Ltd., Halifax, England. [Vol.61,p.146E.]

The drive for this machine is through a double train of gears, the steel pinion on the motor shaft meshing with a compressed paper gear, while



the second pair are of steel. The reverse motion for tapping has been embodied in the saddle and provides for tap withdrawal at four times the tapping speed. It is claimed that there is no shock whatever in this reverse mechanism, although the clutches are positive and not of the friction type. The gear changes are controlled by one handle only. The three positive feeds, 48, 78, and 128 cuts per inch, are embodied in the saddle itself, sliding gears being used. The gear box under the motor gives four changes, which, together with the double gears on the saddle, give eight spindle speeds, ranging from 45 to 500 rev. per minute.

— 19 —

Drilling and Countersinking Machine, Combustion Chamber

Campbells & Hunter, Ltd., Leeds, England. [Vol.61, p.120E.]

This machine is employed chiefly for drilling and countersinking in position the combustion chamber plates of marine boilers. The box-section bed is of T shape, the two right-angled parts being tongued and bolted together. The box-section column has

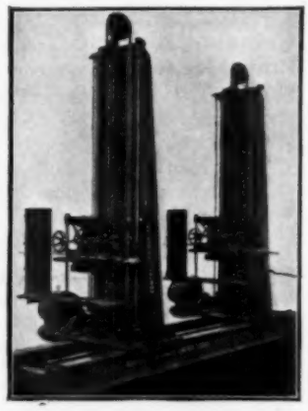
a horizontal traverse of 10 ft. on the bed, either by hand or power. The two drilling saddles mounted on the column are balanced by weights. The bottom saddle is adjustable laterally on a slide through a distance of 1½ in. on each side of the center line, so that the two spindles can be put out of line vertically. The drilling spindles have a feed of 18 in. The top saddle is fitted with a slide for carrying the drill used when countersinking flanged plates. The table can be revolved by hand or power, through worm gears.

— 20 —

Drilling, Tapping and Staying Machine, Horizontal, Double-Column

Campbells & Hunter, Ltd., Leeds, England. [Vol.60, p.171E.]

This double-column machine will drill and tap stay holes 2 in. in diameter in the backs of marine boilers through both shell and combustion chamber plates, and screw the stays into position. It will also tap the stay



tube holes up to 4 in. in diameter through both plates at once, and screw the tubes into position. Each spindle is 3½ in. in diameter and has a feed of 30 in. The area covered by the spindles is 13 ft. high by 17 ft. long. The foundation baseplate has broad square guide-ways on which the columns have a longitudinal traverse, self-acting both ways, and controlled from the saddle. The machine is driven by means of two variable-speed electric motors of 15 hp., each mounted on an extension bolted to the base of a column. The floor space occupied is 21 ft. 6 in. by 8 ft. 6 in. wide and the machine is 19 ft. 6 in. high, its approximate weight being 25 tons.

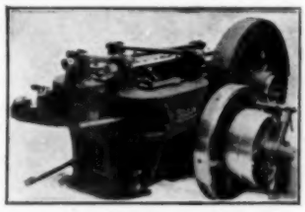
Forging Machines

— 21 —

Forging and Upsetting Machine

Selson Engineering Co., Ltd., Queen Victoria St., London, E.C., England. [Vol. 61,p.22E.]

This machine is for forging metal up to 1¾ in. in diameter. The features include the drive by a patented rotary-key clutch. When the machine is running idly the only parts in motion are the pulleys, flywheels and driving gears. The crankshaft and, therefore, the die and



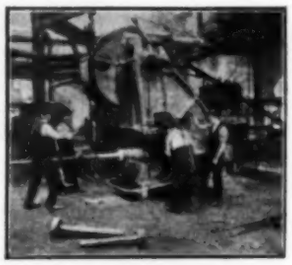
heading slides are then stationary, with a resultant saving in wear. The driving wheel has four keyways, so that the die and heading slides may be set in motion in not more than a quarter of a revolution. On the depression of the treadle by the operator, the rotary key finds its own place in the keyway of the driving wheel. For purposes of safety, four breaker bolts are provided. During the first portion of the stroke the dies are closed by a link toggle system, gripping the work firmly so as to resist the blow. Mounted on the front of the heading slide, the tool then comes into operation, making the forging by forcing the hot metal into the dies. The slide then begins its backward stroke, the dies re-opening and releasing the work.

— 22 —

Forging Machine, Universal

B. & S. Massey, Ltd., Manchester, England. [Vol. 61,p.50E.]

This machine combines many of the advantages both



of the power hammer and the hydraulic press. A crank with heavy flywheel is driven by belt or, if required, by motor mounted on the machine, and actuates a piston contained in a hollow ram, to which the motion of the piston is transmitted by oil. The ram has a constant reciprocating motion of 2½ in., but its position can be raised or lowered instantly by 7 in. and the height of the work to be dealt with is limited only by the height of the anvil pallet. The position of reciprocation of the ram can be controlled to the extent mentioned by a valve which permits the oil to flow from one side of the piston to the other. The distance between the pallets when the ram is at the bottom of its stroke is thus capable of quick and accurate adjustment.

Work of large variety has been done, including a crank made from a 7¼-in. by 3½-in. billet; one end was drawn out and the crank was cut off in 8½ minutes.

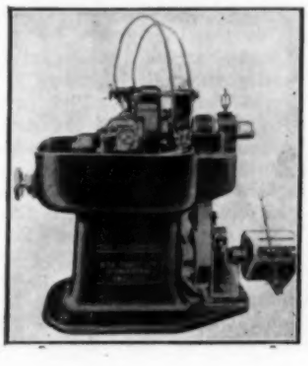
Grinding Machines

— 23 —

Grinder, Centerless, Coventry, No. 2

Burton, Griffiths & Co., Ltd., London, S.W., England. [Vol.61,p.61E.]

This machine is manufactured under license by B.S.A. Tools, Ltd., Birmingham. It is designed for the rapid production of rollers, gudgeon pins and other small cylindri-



cal parts. The face of an abrasive wheel is employed instead of the peripheries of two or more grinding wheels. The work rotates and travels radially across the face of the wheel. The wheel employed is 16 in. in diameter. In its passage across the face of the wheel the work is supported in a special holder, being held between top and bottom plates, which form a space through which the article to be ground projects slightly. At the back of the work is a support roller, the device thus giving a three-line support. By means of a handwheel the workholder can be tilted from the horizontal position to a maximum inclination of 10 degrees, about 3 degrees being generally best. The greater the inclination the faster the traverse, and for finishing cuts the inclination is lessened. The job is itself caused to rotate by contact

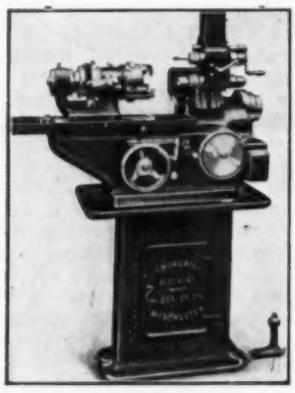
with the grinding wheel. By means of graduations round the dial of the handwheel, feeds can be set to 0.0005 in. The machine will handle work from ¼ to 1¼ in. in diameter and up to 6½ in. long.

— 24 —

Grinder, Internal, Duplex

Charles Churchill & Co., Ltd., London, E.C., England. [Vol.61,p.46E.]

In a number of respects this machine is standard, but it carries two grinding spindles in a vertical slide which has quick motion so that either spindle may be



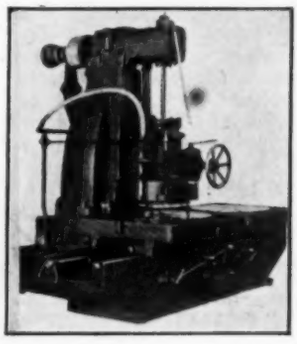
brought into operation in about two seconds. For driving the table power is taken from the countershaft to the three-speed cone pulley and then transmitted to a cam that gives a maximum throw of 1½ in. A tee-slotted crank is coupled to this cam and operates the table through a rack and pinion. A single lever controls the power traverse of the work table and the work can be quickly moved clear of the wheel for gaging purposes. The drive to both spindles is by a single endless belt and jockey pulleys, the vertical adjustment to the spindle bracket being obtained through a rack and pinion. The swivel movement provided for the work table enables an included angle of 16 degrees to be ground. All the spindles are hardened and ground and mounted in ball bearings.

— 25 —

Grinder, Surface, Rotary-Table, Twin, Vertical-Spindle

Lumsden Machine Co., Ltd., Gateshead, England. [Vol. 61,p.47E.]

This grinder has two rotary tables carried on a traveling carriage. The segmental grinding wheel is carried on a flanged steel spindle mounted on ball and roller bearings in a massive cylindrical ram, a special balanced ball thrust being provided. The ram is carried in a saddle. The saddle is raised and lowered by power, and when in its working position is clamped to the column by four bolts, the feed being by the ram, which is provided with hand and variable automatic motions. The



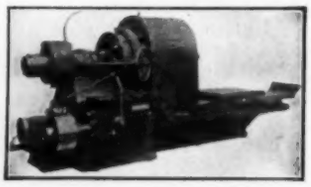
spindle is driven by a shaft which telescopes into the spindle and is driven from the top of the column by belt through spiral-bevel gearing. The segmental wheel is 18 in. in diameter and the circular tables are 35 in. in diameter. The table can be rotated at six speeds, controlled by friction clutches.

— 26 —

Grinder, Surface, Planetary-Head

Lumsden Machine Co., Ltd., Gateshead, England. [Vol. 61,p.60E.]

The bed of this machine is of box section, with a flat surface and a V-guide for the saddle. This carries a tee-slotted square worktable 36 in. square, and the saddle has quick movement by power on



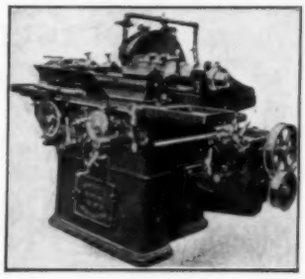
the bed, while the table itself can also be rotated by power. The segmental wheel is mounted on a flanged steel spindle which is carried on roller and ball bearings in a cylindrical ram. The drive from the centre of the wheel carrier to the grinding wheel spindle is by single-helical gears. The rotary motion of the carrier is obtained from a gearbox driven direct from the main spindle end, the gearbox giving two speeds controlled by friction clutches, and the final drive to the carrier is by worm and wormwheel. The carrier can be rotated continuously in one direction or it may be moved through any desired arc.

— 27 —

Grinding Machine, Plain, Heavy

Churchill Machine Tool Co., Ltd., Manchester, England. [Vol.61,p.25E.]

This machine is built on the general lines of a former model, but has been shortened in length capacity and increased in wheel capacity, for dealing with medium-length work, such as motor-car gear-box shafts, stub axles, etc. Its leading feature is the extremely heavy wheel-head and large diameter grinding wheel, the wheel being 18 in. in diam-



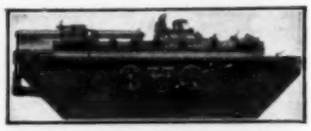
eter and 2 in. wide. The spindle can, however, carry a wheel of double this width, for straight-in-feed operations, or two grinding wheels of distinct diameters may be used simultaneously by the straight-in-feed method. Other features of the machine include the quick hand motion to the wheel-head for rapidly removing the grinding wheel from large to small diameters and vice versa, the gear-box control to table traverse and work rotation speeds—giving four speeds to each motion, both ranges being under independent control; and the single lever control which stops both the reciprocation of the table and the rotation of the work.

— 28 —

Grinder, Precision, Plain, 12x75-In.

Harry F. Atkins, Ltd., Peterborough, England. [Vol. 61,p.44E.]

The table mechanism of this machine is enclosed in one gearbox, eliminating the overhead, and an 18-in. wheel



is carried. Quick withdrawal motion for the wheelhead is provided, a long lever at the front of the machine operating to remove a wedge placed behind the wheelhead screw, thus allowing the head to be drawn back by a weight, the movement being facilitated by the fact that the whole wheelhead is mounted on rollers. A belt is used for driving the work head, the three speeds of which are obtained from gears. Motion is taken from a drum at the back. As regards the table travel, eight speeds and reverse are obtained from a self-contained box which is bolted on two brackets under the back of the machine. Adjustable stops are provided for the table and the motion is automatically reversed.

Lathes

— 29 —

Lathe, 3½-In., Improved

Drummond Brothers, Ltd., Guildford, England. [Vol.61, p.42E.]

The upper section of the illustration shows this lathe as a bench machine with ex-

tra long bed. The latter is still of complete box section and the lathe has a hollow spindle which runs in concentrically-adjustable bronze bearings, with ball thrusts, positively-located headstock and tee-slotted boring table. The maximum swing over the saddle is 4¼ in. and the maximum swing in the gap is 9 in. The extended bed takes 28 in. between centers. A close view of the toolholder as used for boring purposes is shown below. For it a pillar is cast integral with the top slide. This consists of a hardened and tempered steel block, with a central hole a sliding fit to the pillar mentioned, on which it can be turned. The block is split so

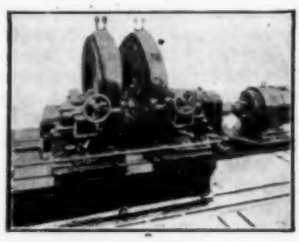
that it can be clamped in position by a hardened bolt. The tool is carried in a square hole and secured by two hardened set screws. Thus the holder can be quickly adapted for turning or boring and height adjustment of the tool by ⅝ in. is provided for by vertical adjustment on the pillar.

— 30 —

Turning Machine, Crankpin, Duplex

G. Richards & Co., Ltd., Broadheath, England. [Vol. 61,p.71E.]

This machine is particularly adapted for the production of automobile crankshafts, two crankpins being



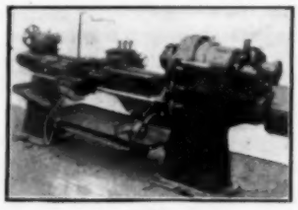
machined simultaneously. Two heads or yokes are used, carrying the rotating cutter slides or rotors. One head is fixed and the other is adjustable longitudinally along the bed to provide for varying distances of crank centers. The yokes are machined to receive the rotors, V-bearings being provided which are adjustable for wear. The yokes and rotors are purposely made very massive, with the object of absorbing any vibration from the cutting tools. The slide, to which is directly attached a cutting tool of the former or ribbon type, is operated through a screw and worm motion in the rotor. The rotors are driven through a 6 to 1 reduction on the main drive and through a four-speed box provided with double friction clutch. This is directly coupled to a 2 to 1 variable-speed motor, so that only one change is required through a sliding gear to obtain the whole range of speeds, without stopping or slowing the machine, and the speeds are instantly available while the machine is in actual operation.

— 31 —

Lathe, 6½-In.

Dean, Smith & Grace, Ltd., Keighley, England. [Vol.61, p.70E.]

A back view of this lathe is given in the accompanying illustration so as to show the relieving and taper-turning attachments. This machine has a friction-geared head, but it is also available with ordinary cone-pulley drive or with an all-geared head. On a 6-ft. bed it admits 27 in. between centers. It swings 9¼ in. over the saddle and 23¼ in. in the gap. A gear-box on the front of the machine gives four feeds in geometric progression, from 92 to 23 cuts per in. All the gears in the box are of heat-treated steel, sliding keys providing the necessary engagement. The box has no oil holes or pegs, all the bear-



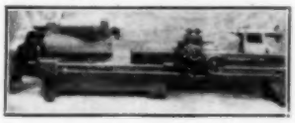
ings being supplied by syphon lubricator from oil wells. The box also contains a positive clutch for the reverse motion, this controlling both the lead screw and the feed shaft. As the lead screw is geared through the box itself four pitches are obtained from each train of gears. The taper-turning attachment can be engaged or disengaged by tightening or loosening two nuts, and the relieving device is driven from the backshaft of the fast head.

— 32 —

Lathe, General-Purpose, 13-In. Center

C. Redman & Sons, Ltd., Halifax, England. [Vol.61, p.89E.]

A feature of this lathe is the hollow spindle, which will admit bars 4 in. in diameter. The machine swings 26 in. over the bed, 19¼ in. over the



saddle and 18¼ in. wide by 45 in. in diameter in the gap in front of the faceplate. The bed is provided with a half-gap piece. The spindle thrust is taken on ball bearings. A four-step cone pulley with the gearing gives 16 speeds from 6.45 to 331 r.p.m. The swiveling slide rest is indexed for conical turning, and the apron forms a double-walled gear-case. Three feeds or pitches are available without altering the wheels, and the range of feeds provided is from ¼ to 1/96 in. per revolution.

— 33 —

Lathe, 18½-In., Heavy-Duty

Graham & Normanton, Halifax, England. [Vol.60, p.152E.]

This special heavy duty 18½-in. lathe is designed for use in a colliery workshop. It has a front feed shaft. The gap bed is 14 ft. 6 in. long and work 8 ft. long can be machined between the

centers. Work up to 60 in. in diameter can be swung in the gap and 17 in. in front of the faceplate. The latter is 4 ft. in diameter, and has four loose steel jaws, forming a chuck. The driving cone has four speeds for a 5-in. belt, the largest diameter being 20 in. and the smallest 14 in. The double gear ratio is 8 to 1 and, with a two-speed countershaft, the 16 spindle speeds range from 7 to 300 r.p.m. The apron control is through the gear-box. This gives three positive feeds and reverse to the front feed shaft, viz.: 32, 16, and 12 cuts per in. The feeds are operated by friction clutches, the pinions, sliding gears and clutches being of steel.

— 34 —

Lathe, Gap, 17-In.

Selson Engineering Co., Ltd., Queen Victoria St., London, E.C., England. [Vol. 61,p.43E.]

The bed of this lathe is provided with a removable half-gap piece, and takes work 5 ft. long between centers. The machine swings 17¼ in. over the bed, 28½ in. in the gap, or 10 in. over the carriage. The headstock is all-geared, the eight speeds ranging from 14 to 330 r.p.m. The feed gears are of steel.

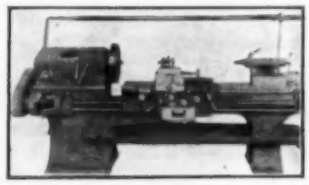
The tailstock sets over for taper-turning. The carriage has a cross-slide with compound slide-rest. The compound slide-rest swivels, and the toolholder is a steel square turret to take four tools. A quick-change gear-box forms a complete unit mounted on the bed. From it 28 threads are obtained without extra change gears, and the same number of feeds. Metric or special pitches can be cut by the introduction of extra change gears on the outside of the bed.

— 35 —

Lathe, Geared 7½-In.

Colchester Lathe Co., Hythe, Colchester, England. [Vol.61,p.18E.]

This machine is fitted with a patent apron whereby sliding and surfacing feeds are not only put into action by a



single lever but are also released by the same lever. The device also provides for the instantaneous release of the feeds under the heaviest cuts. It is thought to combine absolute simplicity with safety and quick and very easy handling. All spindles in the headstock, except the main spindle, run on ball bearings. The gears are of heat-treated steel. They give eight speeds in geometrical progression ranging from 18 to 250 r.p.m. The mechanism at the back of the headstock provides for reversal without stopping the lathe. The quick-change gear-box gives 32 different pitches for screw-cutting from 4 to 60 threads per inch, and 32 feeds from 16 cuts to 240 cuts per inch.

— 36 —

Lathe, Geared, 6½-in., Electrically-Driven

J. Lang & Sons, Ltd., Johnstone, England. [Vol. 61,24E.]

The headstock of this lathe includes the following features: (1) 12 spindle speeds ranging from 9.6 to 260 r.p.m., (2) large diameter taper cone clutch on fastest running shaft, (3) Ferodo-lined brake, (4) all levers interlocking, (5) all levers ac-

tuate clutch and brake before changing gears, (6) all sliding gears hardened, (7) sliding gears fitted on castellated shafts, (8) free position of spindle by lever nearest the working position of the op-

erator, (9) slow speeds through pinion driving large diameter wheel, (10) plate on front of headstock to show spindle speeds, (11) plunger pump, (12) no friction clutches on slow running shafts, (13) no wheels driving pinions, and (14) no gears in mesh unless transmitting power.

The lathe admits 2 ft. between centers and swings 9 in. over the saddle, the gap admitting work 24 in. in diameter by 8½ in. in front of the faceplate. Four feeds are provided by the gear box and the number can be increased by change gears. A 4-hp. motor is mounted on a stool at the head end of the bed.

— 37 —

Lathe, Geared, 9½-In.

Colchester Lathe Co., Hythe, Colchester, England. [Vol.61,p.62E.]

This lathe swings 14 in. over the saddle. The headstock is totally enclosed, thus forming an oil bath.

The spindle thrust is taken by ball thrust washers. Ball bearings are used throughout except for the main spindle, and the 12 speeds range in geometric progression from 7 to 290 r.p.m. A quick-change gearbox gives 32 thread pitches from 2 to 30 per inch, and 32 feeds from 8 to 120 per inch. Only one gear can be engaged at a time in the headstock and the apron feeds are interlocked.

— 38 —

Lathe, Wheel, Locomotive, 74-In.

Ward, Haggas & Smith, Keighley, England. [Vol.61, p.102E.]

This machine will accommodate locomotive wheels up to 74 in. in diameter over the tread and 40 in. in diameter minimum, the maximum distance between the faceplates being 9 ft. 2 in. and the minimum distance 6 ft. 8 in. The bed supports a fixed headstock on the left and a loose headstock at the right, with two heavy tool-rests carried on a projection. The loose

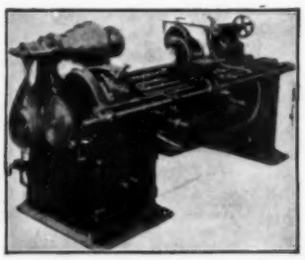
headstock is adjustable along the bed by a 10-hp. reversing motor and gearing, starting and stopping being effected by a lever on the bed which controls a friction clutch, an automatic stop motion preventing the headstock overrunning. The tool-rests have hand adjustment for in and out travel and longitudinal traverse. Self-acting longitudinal feed is provided, and the rests will swivel to give taper to the wheel treads. The feeds are positive and reversible and are operated independently in each case, so that the faceplates can be run at different speeds.

— 39 —

Ring-Cutting Lathe, Rubber, Automatic

Henry Broadbent, Ltd., Sowerby Bridge, England. [Vol.60,p.167E.]

In the operation of this machine the rubber rolls are mounted on mandrels and the lathe will swing rolls up to 15½ in. in diameter by 28 in. long. It is fully automatic. The bed is of duplex type, cast in one piece. The width across the face of the front portion is 7½ in. and across the rear portion 8 in., the depth of the bed being 9 in. The two headstocks are mounted on the rear part. The cutting-off rest is mounted on the front slide of the bed. It has automatic



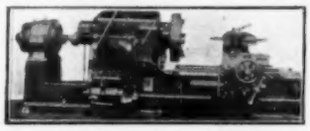
traverse by screw and hand traverse by pinion and rack. On the top slide is mounted the bracket which carries the circular cutter. This top slide is adjusted in and out by hand. The second slide is fed inwards automatically by a cam carried on the front shaft, three cams being provided which give movements respectively of ⅝ in., 1 in., and 1½ in. The machine automatically cuts the whole length between the centers and then stops feeding. Through the magazine-type gear box it cuts rings of thicknesses ranging from 1/32 to ½ in. Three rates of feed are provided. The feed mechanism is belt driven by the crossed drive at the end of the driving headstock. The weight is about 1,600 pounds.

— 40 —

Lathe, Surfacing and Boring, 30-In.

J. Lang & Sons, Ltd., Johnstone, England. [Vol. 61,p.56E.]

The mechanism of this lathe includes a variable-speed drive and automatic speed-changing mechanism.



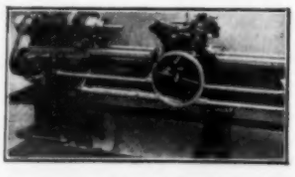
The fast headstock carries the variable-speed drive. It can be used with single- and triple-gear, in ratios of 4 to 1 and 16 to 1 respectively, and is so arranged that, even when running at the greatest speed, there is a reduction by gearing. The spindle speeds range from 220 to 7 r.p.m. and, controlled by the speed-changing device, they automatically increase as the tool travels towards the center. The gearbox gives four borings or surfacing feeds, from ¼ to 1/16 in. per rev., which may be varied or reversed while the lathe is running.

— 41 —

Turret Lathe, Bar, 2¼x36-In.

J. Holroyd & Co., Milnrow, near Rochdale, England. [Vol.61,p.39E.]

The driving head of this machine is all-geared, giving 12 speeds to the spindle, all obtained by sliding gears and adjustable friction clutches operated by levers at the front. The spindle speeds range from 24 to 408 r.p.m.



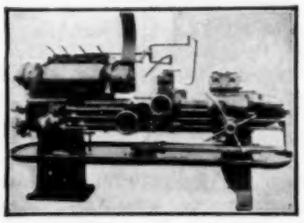
The apron gives two bearings to each shaft and six power drives in each direction are provided, a drop worm box being employed. The turret is of hexagonal form. The shank of the turret is of special form, the top portion providing a large bearing, while the lower portion has a ball bearing so that the turret can be revolved easily, even when carrying a full set of tool holders. The feed box is driven by belt at the end of the main spindle and gives six feeds ranging from 40 up to 121 cuts per inch. Reversing motion is also provided.

— 42 —

Turret Lathe, Combination, 7-In.

H. W. Ward & Co., Ltd., Birmingham, England. [Vol. 61,p.45E.]

On a bed 7 ft. long, this machine swings 14¾ in. over the bed and 7¼ in. over the saddle. The headstock is driven by single pulley and gives eight speeds in each direction. All the speed changes are effected by sliding gears, controlled by levers. Each lever is connected to the driving clutch as well as to its particular sliding gear. To make a speed change, the lever is



first depressed to disengage the clutch and then moved horizontally to slide the gear. The latter movement cannot be effected until after the depression of the lever; consequently no gear can be moved with the clutch in action. The eight spindle speeds range from 20 to 460 r.p.m. The saddle has self-acting sliding, surfacing and screw-cutting motions arranged to prevent conflicting movements. The ten reversible feeds provided range from 13 to 270 rev. per inch, the length of the longitudinal feed being 24 in. The turret is hexagonal and is mounted on a saddle sliding directly on the bed. It has a longitudinal traverse of 24 in. and admits 35 in. between spindle nose and face of turret.

Milling Machines

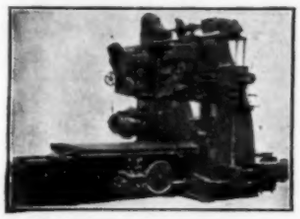
— 43 —

Plano-Milling Machine, Universal

Kendall & Gent, Ltd., Manchester, England. [Vol. 61,p.53E.]

These machines are built in various sizes and supplied with one, two, three or four saddles. The machine shown has two vertical saddles on the cross-slide and one horizontal saddle on each upright. The spindles are 3¼ in. in diameter and work 10 ft. long 4 ft. 6 in. wide

and 3 ft. 6 in. high can be machined. The drive is by constant-speed motor coupled direct to a gear-box in which the hardened steel gears run in oil. The transmission to the various spindles is by



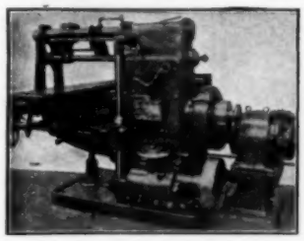
shafts and gearing, the range of speeds being from 11 to 166 r.p.m., in 18 changes. The feed motions of the table and saddle are reversible, being positively driven by gearing, giving a range from 1 to 8 in. travel per min. in nine changes, the feeds being independent of the spindle speeds. Changes both in driving and feed box can be effected while the machine is running, and only the gears necessary for the motion required are in mesh.

— 44 —

Milling Machine, Plain, Electrically-Driven

Alfred Herbert, Ltd., Coventry, England. [Vol.61,p. 16E.]

This machine has a table with a working surface 68x17 in., the automatic feeds being 48 in. longitudinal, 18 in. transverse, and from 1 in. to 22 in. vertical from the center of the spindle. The maximum distance from



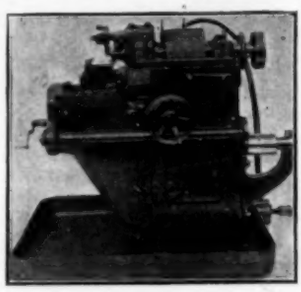
the face of the column to the arm brace is 36¼ in., the overhanging arm being 5 in. in diameter. The distance from the center of the spindle to the arm is 7¾ in. The 16 spindle speeds range from 16.5 to 427 r.p.m., and the 18 feeds from ⅛ to 22½ in. The automatic cross feed is controlled by a handle at the front of the knee, the handle also controlling the automatic vertical feed. All the feeds have automatic stops in both directions. A telescopic elevating screw is provided. The feed drive is by belt, the feeds being interlocked to prevent the engagement of conflicting movements. The control is by a dial motion, the feed changes being independent of the spindle speeds. The feed is transmitted from the box to the knee by shafts and gearing, no universal joints being employed. Handiness in operation has been studied in the design, and, having set the speed and feed, the operator has complete control from the front of the knee.

— 45 —

Milling Machine, Manufacturing

Harry F. Atkins, Peterborough, England. [Vol.61, p.55E.]

This machine is especially adapted for the manufacture of parts entailing milling operations in one cut. A saving in time is effected by



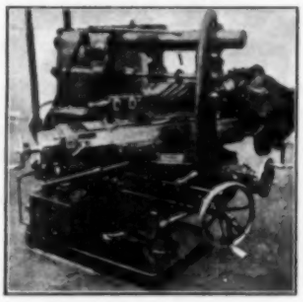
the provision of dual jigs, so that one piece can be jigged while the other is being machined. The machine is also suitable for form-milling of many kinds, as well as plain work. The maximum longitudinal traverse of the table is 8 in., and this can be reduced, as desired, by adjustment of the pin at the end of the slide which trips the rotary motion. The operation of the machine is continuous and apart from the jigging, is entirely automatic. If the work on the second jig is not quite ready the motion can be immediately stopped by withdrawing the clutch. Adjustment is provided for the cutter horizontally and for the table vertically, the latter adjustment being graduated.

— 46 —

Milling Machine, Universal, Single-Pulley

Alfred Herbert, Ltd., Coventry, England. [Vol.61,p. 40E.]

This No. 16 universal milling machine has a table with working surface 51½x12 in., the longitudinal feed being 28 in., transverse feed 9½ in., vertical feed from center of spindle, ½ to 18 in., and the angular adjustment of the table on each side of the center, 46 degrees. The maximum width from face of column to arm brace is 27¼ in. The 16 spindle speeds range from 16.5 to 427 r.p.m. and the 18 feeds from ⅛ to



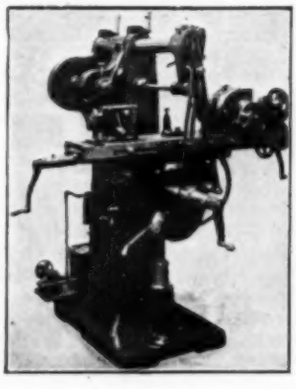
22½ in. per min. The feed is transmitted through the central pivot by a vertical shaft and bevel gearing, but the latter runs at more than three times the speed of the screw, with a proportionate reduction of stress on the teeth and shafts. The bevel gears drive a shaft carried by the table parallel with the screw. This shaft has a pinion solid with it, the pinion driving an internal gear mounted on the screw. The tripping mechanism for the feed can be operated either by hand or by automatic stop. The machine is arranged for direct, plain worm and differential indexing, all divisions being obtainable up to 400, including prime numbers, and many other numbers up to 2,640. With standard change gears spirals can be milled from 0.694 to 144 in. in pitch.

— 47 —

Milling Machine, Universal, No. 1

Midgeley & Sutcliffe, Bradford, England. [Vol.61,p. 114E.]

The drive to this machine is by three-step cone pulley, and the back gearing is in a ratio of 5.6 to 1, giving, with a two-speed countershaft, 12 spindle speeds ranging from 15 to 380 r.p.m. The table is



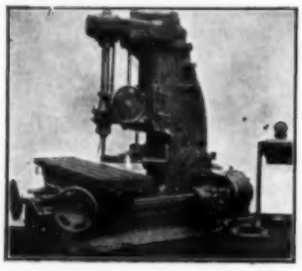
33 in. long by 8¼ in. wide. It swivels 50 degrees in either direction and has automatic traverses, 21 in. longitudinal by 7 in. transverse, the feeds being positively driven through a gearbox and telescopic shaft, in three rates, namely, 0.0081, 0.0123, and 0.0188 in. per rev. of spindle. The feed screws have micrometer dials and automatic trip and reversing motions are provided. The knee bracket has a telescopic elevating screw, the maximum distance between the spindle and the table being 15 in. and the minimum distance 2 in.

— 48 —

Milling Machine, Vertical

Kendall & Gent, Ltd., Manchester, England. [Vol. 61,p.49E.]

The machine illustrated is



driven by an electric motor but the machine can of course be driven by single pulley. The power is transmitted through hardened steel gearing in an oil-tight box giving nine speeds, and then through a gear-case containing double gearing, thus providing 18 spindle speeds ranging from 20 to 300 r.p.m. The spindle is of high-carbon steel 3½ in. in diameter, the distance from the center to the vertical slide on the main frame being 20 in. The distance from the center to the bottom of the gap in the main frame is 26 in., while the height admitted in the gap is 14 in., the distance between the spindle nose and the table being 10½ in. minimum and 29 in. maximum. The table has a longitudinal traverse of 29 in. and a transverse traverse of 51 in. The reversible feeds are nine in number for each spindle speed and range from ¾ to 6 in. per min. for all motions. They are obtained through hardened steel gearing in an oil-tight box, and automatic trip motions are provided to the longitudinal and transverse motions, an index plate showing the position of the levers for any required feed.

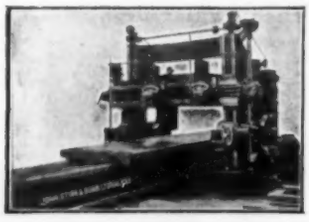
Planers, Shapers and Slotters

— 49 —

Planer, Large, Electrically-Driven

J. Stirk & Sons, Ltd., Halifax, England. [Vol.61,p. 23E.]

The table of this planer is 6 ft. 11 in. wide by 16 ft. long, and the machine will admit 100 in. between the uprights by 72 in. in height. The bed is sufficiently long to take a table up to 20 ft. long, if necessary. The planer has two heads on the cross slide



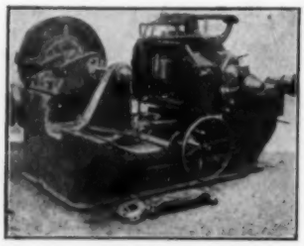
and one on each upright. Electric feed is given to all four heads, and power traverses to the two cross-slide heads and the near-side head. The feeds are eight in number, from $\frac{1}{32}$ to $1\frac{1}{4}$ in., change of feed being accomplished instantaneously. A magnetic relieving device is fitted for broad feeds. The drive is by motor connected direct to the machine gearing, the current for this motor being supplied from a special generator which is itself driven by a motor supplied from the main. By manipulation of the magnetic field the special generator will supply variable voltage and alternate polarity. As the final motor is independently excited the variation of the generator voltage gives variable speeds, and the alternation of polarity provides for reversal.

— 50 —

Planer, Gear, Double-Helical

J. Parkinson & Son, Shipley, England. [Vol. 61, p. 45E.]

This is a machine for generating double-helical gears



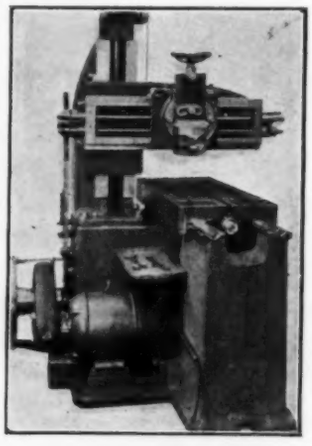
with continuous, interrupted, or staggered teeth. It will cut pinions from $2\frac{1}{2}$ in. in bottom diameter, up to gears 48 in. in outside diameter. Smaller diameters may be cut by special-section cutters, the maximum width of face being 10 in. and the maximum pitch $2\frac{1}{4}$ d.p. The machine is self-contained and driven from the lineshaft by fast and loose pulleys, changes of cutting speeds being obtained by change gears. There are four rates of feed, belt-driven. The blank to be cut is mounted on a horizontal spindle. The spindle is hollow to receive shafts, so that pinions that are solid with their shafts may be cut. The cutters are of high-speed steel, ground to form and pitch after hardening, and are sharpened by being ground across the face without altering the form. They are of the Sunderland type, rack-shaped and with teeth inclined at the angle of spiral to be cut.

— 51 —

Planing Machine, Open-Side

Ward, Haggas & Smith, Keighley, England. [Vol.61, p.49E.]

This machine will accommodate work 17 in. high under the arm, the table being



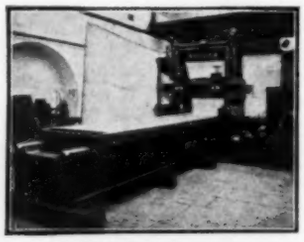
46 in. long by 18 in. wide. As illustrated, the machine is driven by an electric motor, but it can be driven by a single pulley and clutch, giving six table speeds ranging from 8 to 70 strokes per min., the maximum ratio of the gearing being 60 to 1 and the minimum ratio 6 to 1. Horizontal, vertical and angular feeds are available, the feeds ranging up to $\frac{3}{8}$ in. The horizontal travel of the tool is 22 in., and the vertical travel 6 in. The length of the bed supporting the table is $55\frac{1}{2}$ in., and the table is held to the bed by gibs underneath, preventing any lifting tendency. The table is guided in vees, with rollers running in oil pockets in the bed, and the crank motion provides a quick return.

— 52 —

Planer, Large, Electrically-Driven

Butler Machine Tool Co., Ltd., Halifax, England. [Vol. 61,p.57E.]

This planing machine will handle work 16 ft. long by



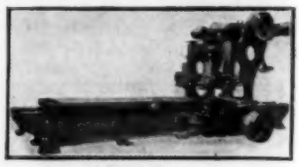
4 ft. wide by 4 ft. high. It is operated by a reversing motor equipment made by the Lancashire Dynamo & Motor Co., Ltd., Trafford Park, the main motor being of 24 hp. at from 575 to 1,150 r.p.m. The equipment gives a range of cutting speeds between 20 and 75 ft. per min. and returns at from 55 to 150 ft. per min. An accelerating device is provided for speeding up between the cuts on two surfaces some distance apart, and for accelerating after the tool has entered the cut. For the quick power traverses and for raising and lowering the cross slide a 4-hp. motor is supplied. The cross slide carries two toolboxes and a side toolbox is fitted on each standard. The feeds are mechanically operated and quick power adjustment is provided for the main toolboxes. The usual features of the planers manufactured by this company are incorporated in this electrically-driven model.

— 53 —

Planer, Heavy-Duty

C. Redman & Sons, Ltd., Halifax, England. [Vol.61, p.63E.]

This planer admits work 3 ft. by 3 ft. by 13 ft. long and provides four cutting speeds ranging from 30 to 63 ft. per min. The return speed is at 120 ft. per min., and the overhead drive is self-contained, a 12-hp. motor being used. The housings are of box section, secured to the bed by screws and taper dowel pins and tied by the cross beam. The



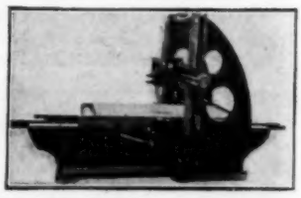
cross slide is $12\frac{1}{2}$ in. deep and is stiffened by a box brace at the back. Both tool boxes on the cross slide are self-acting in all directions, the depth of the down feed being $12\frac{1}{2}$ in., and the cross slide itself is raised and lowered by power through friction clutch. Quick power movement is also provided to both cross slide tool boxes.

— 54 —

Planer with Spiral Gear Drive

C. Redman & Sons, Ltd., Halifax, England. [Vol.61, p.113E.]

The table of this planer is driven by spiral gearing on the Sellers principle. The maximum speed for cutting is 40 ft. per min. and the return is at 130 ft. per min. The machine has one tool box only, but two or more can be fitted if required. The tool box is quite universal, with automatic feed in any direction and graduated for swiveling through 140 degrees. The slide may be readily locked without disturbing the



alignment. The feed motion is of the firm's standard friction-band type. The horizontal feeds range from $\frac{1}{32}$ to $\frac{7}{16}$ in. and the down feeds vary from 1/45 to $\frac{11}{32}$ in. The horizontal, vertical and angular feed motions are reversible and variable without stopping the machine.

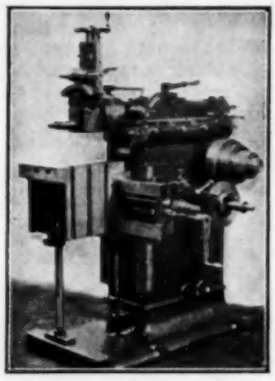
— 55 —

Shaper, Crank, Single-Gear, Improved, 12-In.

Fletcher Brothers, Halifax, England. [Vol.60,p. 135E.]

This machine is fitted with an adjustable crankpin block, consisting of a cast-iron block fitted with a steel strip having taper adjustment by screw. This arrangement

enables the wear of the crankpin block to be taken up as required. The tool-head has a vertical movement of 5½ in. It swivels to any angle and has a graduated collar



reading to 0.001 in. The tool-head is locked in position by means of a one-lock device. The table is 14 in. long by 11¾ in. deep. Its horizontal traverse is 16 in. and vertical traverse 12 in. There are three changes of automatic cross feed in either direction.

— 56 —

Shaper, Double-Head, 20-In. Stroke

H. Holmes & Co., Halifax, England. [Vol.60,p.170E.]

This double moving-head shaping machine is arranged for motor and gear box drive at each end. The bed is 10 ft. 3 in. long. The two work tables are 25 in. long by 17 in. wide by 15 in. deep,

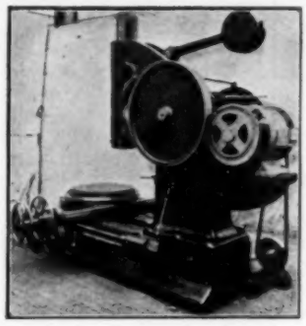
one carrying a quick-action machine vise. An innovation is a slipping dog used in connection with the down feed mechanism to the toolboxes. Here a split collar has two grub screws. Before a machine is despatched the bolt is tightened so as to feed, but weak enough to slip in face of an obstruction. The two grub screws are then screwed up against the opposite face and thus prevent the operator tightening the collar too much, and allowing slippage if the ram stroke is changed without readjusting the dog.

— 57 —

Slotting Machine, 14-In. Stroke

Butler Machine Tool Co., Ltd., Halifax, England. [Vol. 61,p.20E.]

All speed changes on this



machine are obtained by means of steel gears arranged inside the trunk of the machine. The range of speeds is graded to provide approximately the same cutting speed on every 2-in. variation of stroke. The feed motion is operated from a cam in the face of the rear driving wheel. Quick power adjustment is available in all directions in using the table slides.

The drive is by constant-speed motor. The machine will admit pieces 52 in. in diameter by 27 in. deep, or 60 in. in diameter by 12 in. deep. The table is 30½ in. in diameter. The approximate net weight (without motor) is 5¼ tons.

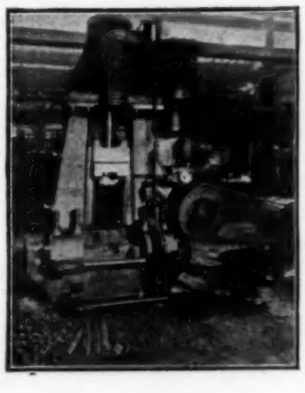
Other Machine Tools

— 58 —

Stamp, Pneumatic, 10-Cwt.

B. & S. Massey, Ltd., Manchester, England. [Vol.61,p. 21E.]

This machine is introduced for use in stamping shops where steam cannot conveniently be employed, but where the effect of double-acting steam stamps is preferred. The machine follows in general principle the firm's pneumatic power hammers. Two cylinders are provided in a single casting, the tops and bottoms of the two cylinders being connected by special passages, opened or closed at will by the control valve. The piston in the pump cylinder is caused to reciprocate continuously. The air compressed on the down stroke of the pump piston is used to raise the tup, and the air compressed on the up stroke of the pump to throw it down. When the control valve is in the "full-work" position the passages are left wide open and the maximum self-acting blows are obtained. By means of the valve these passages can be closed and another opened, connecting the top and bottom of the pump cylinder,



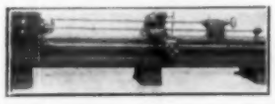
thus allowing the pump to reciprocate without compressing air at all. Intermediate between these positions are those where the bye-pass is partly closed and the other passages are also restricted in varying degrees, thus providing for a wide variety in the length and force of blow obtained. Means are also provided whereby the tup can be made to hold up at the top of its stroke or to swing idly in the upper part of its stroke.

— 59 —

Milling Machine, Screw-Thread

Summerskill Bros., Sowerby Bridge, England. [Vol. 61,p.130E.]

This machine will cut screws up to 10 ft. long between the centers and from ¼ up to 3 in. in diameter in the steady rests. Worms up



to 5 in. in diameter can also be cut. The work spindle, cutter spindle, and oil pump are all driven by one belt. The patented features of the headstock comprise (1) the application of an arrangement of gearing for driving the bar to be milled, which introduces a worm held in engagement with a worm-wheel during the cutting operation, and which on completion may be dropped out of engagement, and (2) the method of engaging and disengaging the worm. The cutter-driving shaft is driven from a two-speed cone by gearing and enters the headstock where various speed changes are provided in the usual way by sliding gears. The third shaft of the headstock constitutes the screw which operates the cutter saddle.

— 60 —

Chucking Machine, Automatic, Vertical, 6-Spindle

T. Ryder & Sons, Ltd., Bolton, England. [Vol.61,p.52E.]

This chucking machine is of the work-revolving type having capacity for work 4 in. in diameter by 6 in. long. The pieces to be machined are held in Taylor concentric chucks. One of the six spindles is automatically stopped

when it reaches the front position, so that the machined piece may be removed and another casting or forging inserted. The work spindles are automatically moved from position to position. The power is taken from a single pulley through a train of gears on to a worm shaft and wormwheel connected to a large central spur gear, from which six pinions placed around it are driven. The pinions are on the lower ends of the spindles carrying the chucks. The forming slides are diametrically opposed and are operated from internal cam drums. The indexing of the work table is also operated by cams and a clutch system. A separate feed belt drives through a gear box and bevels to a vertical shaft contained in the column of the machine. On this shaft at the top is mounted a cam drum, from which the various turning and boring feeds are obtained. Turning speeds can be varied in the gear box.

— 61 —

Cock-Boring Machine

Charles Taylor, Ltd., Birmingham, England. [Vol.61,p. 72E.]

This machine is available in two sizes, the larger for work up to 2 in. in diameter at the large end and 3½ in. long on the taper, the smaller machine being adapted for

work up to 1¼ in. in diameter by 2¼ in. long. A vertical spindle is employed, carrying a set of three taper reamers. The first is a flat reamer for roughing-out the cored hole; the second, a reamer with staggered teeth for removing most of the excess material; and the third,

a fine-fluted reamer for finishing purposes. The machine spindle in the larger machine is 1¼ in. in diameter with a vertical movement of 7½ in. In the smaller machine it is ¾ in. in diameter with 5½ in. of movement. The drive is by a three-speed cone pulley and bevel gears, and the vertical movement is obtained from a steel rack and pinion controlled by a pilot wheel. The spindle has a ball thrust bearing and is counterbalanced by spring.

— 62 —

Cutting-Off Machine, Light

Charles Taylor, Ltd., Birmingham, England. [Vol.61,p.74E.]

This is a self-contained machine driven by fast and loose pulley, the motion being transmitted direct from the countershaft to the saw spindle by means of a chain. This and the circular saw are completely guarded. The saw spindle is of hardened and ground steel, and the bearings throughout are of gunmetal, the speed of the saw being 450 r.p.m. The saw is 8 in. in diameter by ⅛ in. thick. The arm is bal-

anced by a spring, and in cutting-off is pulled down by the handle shown.

— 63 —

Hacksawing Machines

New Fortuna Machine Co., Ltd., Southmead, Bristol, England. [Vol.61,p.38E.]

The essential mechanical features of these machines do not differ greatly from those made by this company for some time. A 5x5-in. machine has an improved arrangement for starting and stopping. The saw frame of the 10x12-in. machine has a tubular bow for durability and a universal swivel vise.

The 6x6-in. motor-driven machine is illustrated and also incorporates the universal vise. The motor is mounted beneath the frame and drives through a chain.

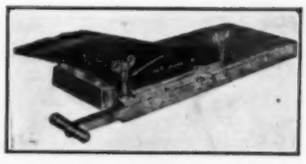
Other Machines

— 64 —

Belt Cutter, "Trump"

Harlie Bros., 183 *Dalston Lane, London, E., England.* [Vol.61,p.22E.]

This belt cutter is made in sizes to deal with belts up to 6 in. and 12 in. wide. The firm also makes a belt fastener and this can be combined with the belt cutter on a single baseboard. At one end of the board is a steel plate against which the long edge of the belt is placed, with the end of the belt to be



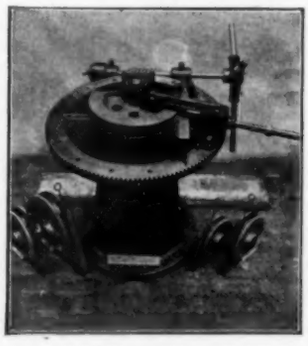
cut projecting over the long side of the board. It is clamped in position by screws and a bridge piece, this being lifted by springs when the wing nuts are released for removing the belt. The length of the baseboard is grooved to take a slide which carries the cutting blade, this being held in a groove by single screw and thus being easily removed for sharpening when necessary. The blade groove is inclined to give the cutting angle required. To prevent wandering the sliding piece is well guided, and the cut is effected by pulling the handle.

— 65 —

Bending Machine, Tube, Improved

New Fortuna Machine Co., Ltd., Bristol, England. [Vol. 61,p.67E.]

The tube under treatment in this machine is placed in the machine and bent against a former by means of a lever. This lever carries a roller by which the pressure is applied, and the machines are available in three sizes, the largest of which will bend tubes up to 2 in. in diameter. For bends of very small radii a filling is recommended, consisting of equal parts of pitch and resin, when the tube as taken from the ma-



chine will be free from ripples. The formers are of cast iron or may be turned up in hard wood, and they are placed on a central pin. The formers are grooved to suit the pipe under treatment. The worm-driven universal machine is illustrated. This will take tubes up to 2 in. in outside diameter and will bend to a radius of 6½ in., steel tubes up to ¼ in. thick being taken. The worm-wheel is of steel, machine-cut, and double thrust ball bearings are provided for the worm. The formers employed are of cast iron and the guides on which pressure is effected are of mild steel.

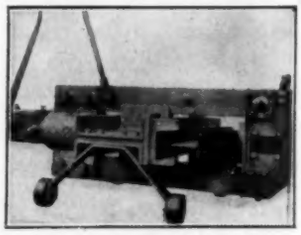
The universal machines have a pointer lever which by adjustment determines the correct position of any radius.

— 66 —

Bending and Straightening Machine, Hydraulic, Portable

Leeds Engineering & Hydraulic Co., Ltd., Rodley, England. [Vol.61,p.136E.]

This machine has been specially designed for railways, steel merchants, etc., who require to bend rails and all steel sections. The pump and press are self-contained and



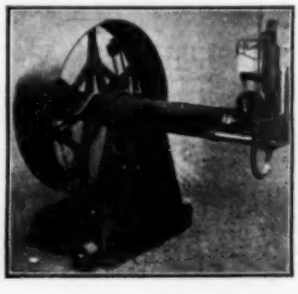
mounted on four wheels. The bending blocks are traversed to and from the work by means of ratchet lever and pitch chain. Pressure is applied by the small hand pump, seen on the left, which is integral with the machine. The end block or head is hinged so that long pieces may be inserted in the machine without being threaded through the gap. The machine is being made in two sizes, of 50-ton and 100-ton capacity, respectively. In the smaller the ram stroke is 6 in. In the larger machine the stroke is 9 inches.

— 67 —

Dynamometer, Transmission

Alfred J. Amsler & Co., Schaffhouse, Switzerland. [Vol.60,p.146E.]

This dynamometer is used for measuring and recording the power taken by a machine, provided the machine can be driven by belt. The force can vary within the limits of measurement as rapidly as required, so that the apparatus is suitable for measuring the energy put into machine tools, spinning, weaving and agricultural machines and the like. Two pulleys run side by side, one driven by a motor and the



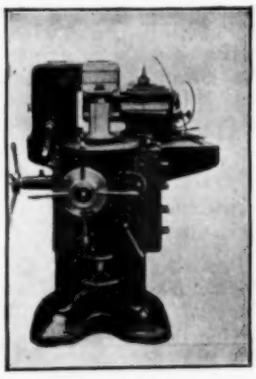
other driving the machine to be tested. They are coupled together by means of a system of two measuring cylinders, with rams moving therein without friction. The two cylinders are fixed to one pulley. The two rams bear against suspensions which are fixed to the other pulley and tend to drive the liquid out of the cylinders. The cylinders are filled with oil and are connected by means of pipes with the axial bore of the pulley shaft. At the end of the shaft the pressure is led to a fixed casing, to which are fitted a spring dynamometer, an oil reservoir and a small hand-pump for refilling the measuring cylinder with oil. The spring dynamometer consists of a cylinder with a ram moving in it without friction. The ram bears downwards against a suspension which is supported by a strong helical spring. Coming from the measuring cylinders on the pulleys, the oil presses the ram of the spring dynamometer downwards and extends the measuring spring to an amount which is proportional to the liquid pressure. The latter again is proportional to the force with which one pulley drives the other. The elongation of the measuring spring, and thus the force to be measured, is indicated by a pointer on a scale. A stylus moves with the suspension and traces the curve of force on a paper band.

— 68 —

Measuring Machine, Gear, Wickham

Alfred Herbert, Ltd., Coventry, England. [Vol.61,p. 68E.]

In testing gears this machine determines the accuracy of (1) involute tooth form, (2) tooth spacing or division, (3) concentricity of each tooth form with the axis of rotation, and (4) parallelism of the teeth with the axis. The gear to be inspected is mounted on an arbor which is fixed in a large work spindle rotating on ball bearings, specially designed to eliminate play and to preserve a truly concentric motion round a stationary axis. The work spindle is situated in a vertically adjustable slide on the front of the column, on the top of which are two slides, one carrying the locating stylo while the other carries the indicating and recording mechanism. There are two indicating pointers inside the indicating head. One registers errors of tooth spacing, the other errors of concentricity. A record of the movements of the two indicators is made on a chart which automatically advances about 0.1 in. for each tooth. The record is made by a presser situated over the two pointers, causing needles in the ends of the pointers to stamp their position on the chart through an inked ribbon. The capacity of the machine is for gears up to 12 in. in diameter by 3 in. face.



— 69 —

Measuring Machine Gage, Universal

Alfred Herbert, Ltd., Coventry, England. [Vol.60,p. 140E.]

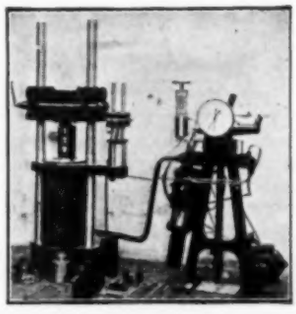
This machine has been improved recently and is now adapted for measuring within plus and minus 0.00001 in. under workshop conditions as to temperature, etc. It is suitable for regular routine work, and can be rapidly operated, every measurement being directly compared with end standards generated from a parent yard, and of accuracy guaranteed to be within five parts in a million. The accuracy of readings is independent of the personal element. The appliance is self-calibrating, and the pressure of its anvils on the work is so light that distortion is negligible, while slight inaccuracies in the machine itself do not affect the accuracy of measurement. The magnification of the fiducial indicator is 4,200 to 1, so that a variation on the work of 0.00001 in. gives a movement of the indicator shadow of 0.04 in. which is easily seen. The machine consists of a base and a leveled bed carrying a calibrated micrometer head, a carriage sliding on ball ways, a workholder sliding on balls, and a chimney carrying the indicating mechanism and the stylo head. Measurements may be made in English or metric sizes, the maximum length measured being 12 in., the maximum external diameter being 12 in. with work stood endwise or 6 in. if placed between centers.

— 70 —

Test Machinery, Compression, for Balls, Ball Bearings, etc.

Alfred J. Amsler & Co., Schaffhouse, Switzerland. [Vol.61,p.2E.]

This apparatus is an assembly of (1) a 100-ton press which can take in balls up to 4 in. in diameter (2) a 10-ton press mounted on the frame of the 100-ton press, to take in balls up to 1¼ in. in diameter; and (3) a 1-ton press for balls from ¼ to ½ in. in diameter mounted to the left on the pendulum dynamometer, and arranged with cam pump and electric motor on one stand. Each press is worked by oil on the hydraulic press principle, and in each case the ram is fitted so exactly in the cylinder that no packing is needed to ensure sufficient oil tightness. To make a crushing test, three balls are placed on top of one another as shown in the illustration, the end balls resting against compression plates provided with a conical hole. The pendulum dynamometer is used for measuring the load applied and is provided with a recording device. An arrangement for testing the deflection of ball races up to the instant of fracture is also made.

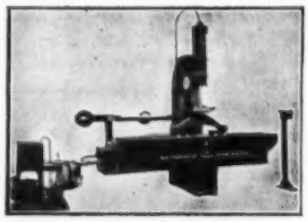


— 71 —

Testing Machine, Railway Spring

W. & T. Avery, Ltd., Birmingham, England. [Vol.60,p. 140E.]

This machine consists of a weighing mechanism of the Avery lever type, upon the table of which the spring to be tested is placed. Pressure is then applied to the top of the spring through the medium of a double-acting hydraulic cylinder, the oil supply being derived from a motor-driven Hele-Shaw pump unit. In using the machine the poise on the steelyard is set to succeeding increments of load, and the hydraulic ram is brought to bear on the spring until the steelyard is balanced. The corresponding deflection of the spring for each load increment is then noted. Similar records are also made for the return stroke of the ram, and the results are compared with the former figures. By this relation of the two series of figures the internal friction of the spring can be ascertained. In addition to this deflection test, the spring can be subjected to a vibratory test, and be compressed solid.



— 72 —

Quartering Machine, Wheel, Locomotive, 86-In.

Scott Bros., Ltd., Halifax, England. [Vol.61,p.98E.]

The two boring headstocks of this machine are identical in design and to suit different lengths of axles are adjustable by hand along the bed. Each head is independently driven by its own variable-speed 5-hp. electric motor, running at from 400 to 800 r.p.m. The saddles are mounted on a 45-degree inclined plane on the front of the head. They are adjustable towards the center by means of handwheel, spiral gears and screw, and secured by four bolts in tee slots.

The locomotive driving wheels to be operated upon are supported between the centers on two stays which are adjustable along the bed and are raised to the centers by screw jacks. Inching devices are provided to properly adjust the position of the crankpin bosses.

Measuring, Gaging and Testing Equipment

— 73 —

Gage, Thread, B.A., Standard

Buck & Hickman, Ltd., Whitechapel Road, London, E., England. [Vol.61,p.142E.]

This B.A. thread gauge is of pocket size. It has been specially produced for this company by the Brown &

Sharpe Manufacturing Co., the well-known makers of micrometers and other precision small tools. It is provided with 11 blades which give a B.A. range of 0 to 10, and a further blade which has a thread tool angle, this of course being chiefly of use for checking the points of thread-turning tools.

— 74 —

Metroscope

Alfred Herbert, Ltd., Coventry, England. [Vol.61,p. 50E.]

Ths is a self-contained automatic measuring device applicable to machine tools of all classes as well as other machines. An instrument of clock form has two pointers, the short hand indicating the inches traversed while the

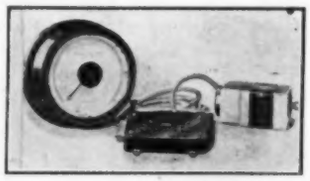
long hand shows decimal or fractional portions of an inch. One complete revolution of the short pointer represents a foot and of the long pointer an inch, and the number of feet measured is shown by a figure which appears through an aperture in the dial face. Instruments with metric graduations can also be supplied. The device is actuated by a master screw attached to the machine at a convenient position by means of two brackets. The screw does not revolve. Consequently, if the gear box is attached to a moving carriage, the motion operates the indicating mechanism, thus showing the displacement of the carriage. By means of a disengaging motion the fingers can be set at zero.

— 75 —

Tachometer, Electrical

British Thomson-Houston Co., Ltd., Rugby, England. [Vol.60,p.166E.]

This instrument consists of a small direct-current generator with permanent magnets, connected to an indicating instrument of the permanent-magnet coil type, the instrument having a scale graduated in revolutions per minute. The generator is mounted in any convenient position near the machine the speed of which it is desired to measure, and may be either direct-coupled or driven by belt or gearing, as conditions require. It is not



necessary that the generator should run at the same speed as the machine. The instrument may be of the indicating or recording type, or if desired both types may be operated simultaneously from the same generator. With a generator of the permanent magnet type operating under the above conditions, the speed-voltage characteristic is practically a straight line, resulting in a uniform scale over the whole range.

Among the advantages claimed for the electrical tachometer over those operating on the centrifugal principle is that the indicating apparatus may be installed at any convenient point remote from the machine. It is suggested that such an installation would be particularly valuable on ships so the officer on the bridge could observe the speed of the turbines or engines.

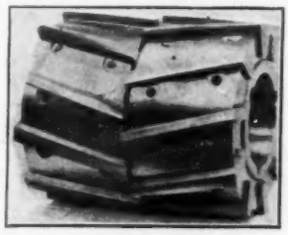
Small Tools

— 76 —

Cutter, Milling, Inserted-Blade, Improved

Brooke Tool Manufacturing Co., Ltd., Greet, Birmingham, England. [Vol.61,p. 118E.]

In this style of cutter the Milbrooke patented system of blade retention is employed. The blades are of rectangular form embedded in slots



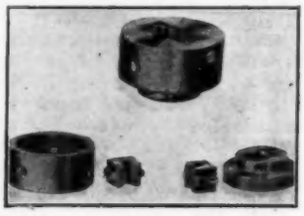
milled in the cutter body and each secured by two wedges. The face and top of the blades are milled to a true helix which may be between 7 and 15 degrees or so, the entry angle and clearance being constant. For slabbing mills that are long proportionately to their diameter, the practice is to make up the cutter in sectional form with the blade helix of adjacent sections of alternate hands, end thrusts being self-neutralizing. The blades are staggered one with the other and the ends overlap.

— 77 —

Die and Stock

B. S. A. Tools, Ltd., Birmingham, England. [Vol.61,p. 26E.]

This device consists of a self-contained collet with rectangular dies and independent adjustment. The adjustment of the dies is accomplished by means of two screws and can be made without removing the collet from the die stock. When



the dies become dull they can be removed from the collet and ground. Should it be necessary to thread up to a face, the dies may be reversed in the collet. These dies are made to thread from ¼ to 1 in., being used in two sizes of collets.

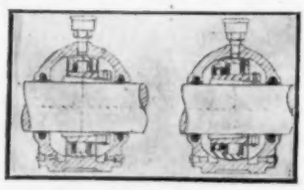
Miscellaneous Equipment

— 78 —

Roller Bearing, Lineshaft, R. & M.

Ransom & Marles Bearing Co., Ltd., Newark-on-Trent, England. [Vol.61,p.86E.]

This bearing consists of hardened steel inner and outer races between which is a row of hardened and ground rollers of length equal to their diameter. The rollers are carried in a cage which spaces them equidistantly and ensures that they run symmetrically between the races. The cage is retained sidewise by side plates which, like the outer race, are formed to a radius struck from the center of the bearing, both outer race and side plates being carried in a



similar seat machined in the housing itself. Motion is therefore permitted so that the bearing can accommodate itself to the alignment of the shaft. The inner race is secured to the shaft by a taper split sleeve which fits a corresponding bore in the race, tightening the end nut on the split adapter plate serving to clamp it in position. The nut is itself held by a spring ring which is used to secure it on the sleeve, ensuring the position of the bearing whatever the direction of rotation of the shaft, and similarly permitting dismantling without damage to the thread. The bearings are furnished mounted in plummer blocks or hangers.

— 79 —

Grinding Device, Commutator

Pape & Bennison, Stanley Road, Barrow-in-Furness, England. [Vol.61,p.120E.]

This device carries a steel

spring which adjusts itself in the radius to be trued and is insulated underneath. Along it is stretched carborundum or similar cloth, and the tension is adjusted by means of four screws, two at each end. At the front

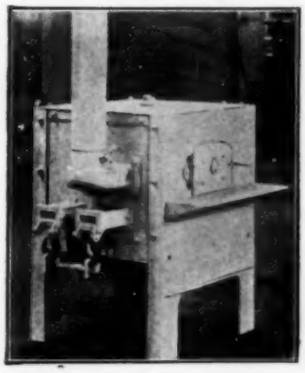
is an adjustable shield of insulating material, preventing any trouble with the brush-gear. The appliance is made in three sizes, the largest of which will true commutators 12 in. in diameter and upwards, while the smallest is for diameters of 4 in. and upwards.

— 80 —

Furnace, Heat-Treatment, Low-Pressure

Brayshaw Furnaces & Tools, Ltd., Manchester, England. [Vol.61,p.56E.]

This furnace is intended for general annealing and accurate heat treatment and provides temperatures up to



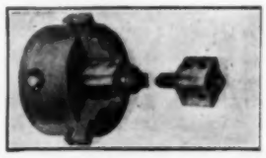
1,200 deg. C. It is of simple construction and the parts are accessible. The flame is first led by flue under the floor to heat the bottom. A special feature of the furnace is that by its means a reducing atmosphere can be obtained to any extent, even to filling the chamber with smoke, as required for certain annealing operations. The burner is simple, explosions due to back pressure being, it is claimed, impossible.

— 81 —

Jaws, Square-Rod, for 3-Jaw Concentric Chuck

G. Twigg & Son, Moseley Road, Birmingham, England. [Vol.60,p.134E.]

These jaws take the form of two small angle plates placed so as to enclose square-section material of any size within the range, the smaller jaw having a flat surface at the exterior angle against which one jaw of the chuck bears, while the other and larger angle piece is provided with set screws on



the sides to enable the rod to be secured centrally. This angle piece is gripped at the outer ends of the angle by the remaining jaws of the chuck. The surfaces at which contact is made with the two chuck jaws are at an angle to ensure pressure towards the center.

— 82 —

Attachment, Nut-Chasing, for Screw-Milling Machine

J. Holroyd & Co., Ltd., Milnrow, near Rochdale, England. [Vol.61,p.63E.]

By means of this attachment the No. 2 screw-milling machine made by this company will also thread nuts for the screws it mills. A bracket is mounted on a cross slide on which it has micrometer hand adjustment, the attachment being fitted to the bed between the cutter head and the work head. The bar carrying the cutting tool

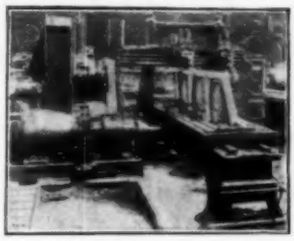
is clamped in the bracket and the nut is gripped in the work-head chuck, thus being revolved and at the same time fed forward according to the pitch of the thread required. Adjustable stops regulate the depth of the cut.

— 83 —

Drive for Planers, Gear-Box and Motor

Lancashire Dynamo & Motor Co., Trafford Park, England. [Vol.60,p.148E.]

The gearing of this drive consists of a driving gear wheel coupled to the motor, three intermediate gear wheels, and the driven gear wheel coupled to the planer pinion. Of the three intermediate gear wheels the first is simply a ratio reduction. The other two wheels are dimensioned so that if one is



used as an intermediate wheel a total speed reduction of 22 to 1 is obtained, while if the other is used a total speed reduction of 6.5 to 1 is obtained, but in the reverse direction of rotation. These two wheels are not on fixed axes, but are carried on separate disks which are supported in bearings concentric to the main driving shaft. If both the disks are left free to revolve round the driving shaft, no turning movement is given to the driven shaft, the gear wheels merely rotating on their own centers; but if either of the disks is locked, motion is imparted to the driven shaft. Therefore, in order to drive the planer, all that is necessary is to lock in turn first one disk and then the other, when the driven shaft will rotate first in one direction at a certain speed and then in the reverse direction at a pre-arranged speed.

— 84 —

Vise, Machine, Self-Centering

John Ackworthie, Ltd., Coleshill St., Manchester, England. [Vol.61,p.82E.]

This vise swivels completely round and can be removed from the base and used as a plain vise, if so required. The screw is raised so that the handle clears the machine table. The jaw pads are held by three screws having heads at the back of the

jaw. Consequently for repetition work other pads can be fitted to suit the job, the self-centering action maintaining the work central. The vises are available in two sizes, with jaws 3 in. wide by 1¼ in. deep and 4¾ in. wide by 1½ in. deep, to open respectively 3 and 5 in. The height of the smaller vise is 4 in. and of the larger 5¾ inches.

THE equipment reviewed in the preceding section of the review issue is that described in the European edition of the *American Machinist* during the six months ending with the last issue in November, 1924.

Details of machines described in the European edition were briefed formerly in the clipping index, discontinued at the close of 1922. In preceding review issues they were included in the European edition of the review, but were not available in the American edition.

With this issue they are made available for the American designer and manufacturer to afford them the opportunity of comparing development in British design with that in American design. The nomenclature given is that appearing in the European edition; no attempt has been made to re-classify and re-name the machines to conform to American practice. The references to volume and page numbers have to do with the European edition.

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D		
Dean, Smith & Grace, Ltd., Keighley, England		
6½-in. lathe	31	133
Drummond Brothers, Ltd., Guildford, England		
Improved 3½-in. lathe	29	132
F		
Fletcher Brothers, Halifax, England		
12-in. improved single-gear crank shaper	55	136
G		
Graham & Normanton, Halifax, England		
18½-in. heavy-duty lathe	33	133
H		
Harlie Bros., 183 Dalston Lane, London, E., England		
"Trump" belt cutter	64	138
Herbert, Alfred, Ltd., Coventry, England		
Electrically-driven, plain milling machine	44	135
Single-pulley universal milling machine	46	135
Wickham gear-measuring machine	68	139
Universal gage-measuring machine	69	139
Metroscope	74	140
Holmes, H., & Co., Halifax, England		
20-in. double-head shaper	56	137
Holroyd, J., & Co., Milnrow, near Rochdale, England		
2½x36-in. bar turret lathe	41	134
Nut-chasing attachment for screw-milling machine	82	141
J		
Jones & Shipman, Ltd., Leicester, England		
Three-spindle sensitive drill	13	130
36-in., gear-driven, sensitive radial drill	15	130
K		
Kearns, H. W., & Co., Ltd., Broadheath, England		
Horizontal boring machine	1	128
Kendall & Gent, Ltd., Manchester, England		
Universal plano-milling machine	43	134
Vertical milling machine	48	135
Kitchen & Wade, Halifax, England		
54-in. heavy, radial drill	17	130
L		
Lancashire Dynamo & Motor Co., Trafford Park, England		
Gear-box and motor drive for planers	83	141

	No.	Page
Lang, J., & Sons, Ltd., Johnstone, England		
6½-in., electrically-driven geared lathe	36	133
30-in., surfacing and boring lathe	40	134
Leeds Engineering & Hydraulic Co., Ltd., Rodley, England		
Portable hydraulic bending and straightening machine	66	138
Lumsden Machine Co., Ltd., Gateshead, England		
Vertical-spindle, rotary table surface grinder	25	132
Planetary-head surface grinder	26	132

M

Massey, B. & S., Ltd., Manchester, England		
Universal forging machine	22	131
12-cwt. pneumatic stamp	58	137
Midgeley & Sutcliffe, Bradford, England		
No. 1 universal milling machine	47	135

N

New Fortuna Machine Co., Ltd., Southmead, Bristol, England		
Hacksawing machines	63	138
Improved tube-bending machine	65	138

P

Pape & Bennison, Stanley Road, Barrow-in-Furness, England		
Commutator grinding device	79	140
Parkinson, J., & Son, Shipley, England		
Double-helical gear planer	50	136
Pollard, F., & Co., Ltd., Leicester, England		
Precision high-speed sensitive drill	12	129
Sensitive and all-geared radial drills	16	130

R

Ranson & Marles Bearing Co., Ltd., Newark-on-Trent, England		
Lineshaft roller bearings	78	140
Redman, C., & Sons, Ltd., Halifax, England		
13-in. general-purpose lathe	32	133
Heavy-duty planer	53	136
Planer with spiral gear drive	54	136
Richards, George, & Co., Ltd., Manchester, England		
Horizontal boring machine	2	128
Improvements on horizontal boring machine	3	128
Duplex crankpin turning machine	30	133
Ryder, T., & Sons, Ltd., Bolton, England		
6-spindle automatic chucking machine	60	137

S

Scott Bros., Ltd., Halifax, England		
42-in. improved radial drill	18	130
86-in. locomotive-wheel quartering machine	72	139
Selson Engineering Co., Ltd., London, E. C., England		
Forging and upsetting machine	21	131
17-in. gap lathe	34	133
Smith & Coventry, Ltd., Manchester, England		
Small precision boring machine	4	128
48-in. vertical turning and boring mill	6	128
Stirk, J., & Sons, Ltd., Halifax, England		
100-in. vertical boring mill	8	129
Electrically-driven planer	49	136
Summerskill Bros., Sowerby Bridge, England		
Screw-thread milling machine	59	137

T

Taylor, Charles, Ltd., Birmingham, England		
Cock-boring machine	61	137
Light cutting-off machine	62	138
Twigg, G., & Son, Birmingham, England		
Square-rod jaws for 3-jaw concentric chuck	81	141

W

Ward, H. W., & Co., Ltd., Birmingham, England		
7-in. combination turret lathe	42	134
Ward, Haggas & Smith, Keighley, England		
74-in. locomotive-wheel lathe	38	134
Open-side planing machine	51	136
Webster & Bennett, Ltd., Coventry, England		
Boring and turning mill with turret and side head	5	128
42-in. double-head boring mill	7	129

Price Changes in the Last Half-Year

Cost of materials shows strengthening during the last two months of the year following marked declines in August, September and October

DURING the last half of 1924, there were few changes of note in the principal materials and supplies, owing perhaps, to pre-election uncertainties. Since November, however, the trend has been upward in many of the important items.

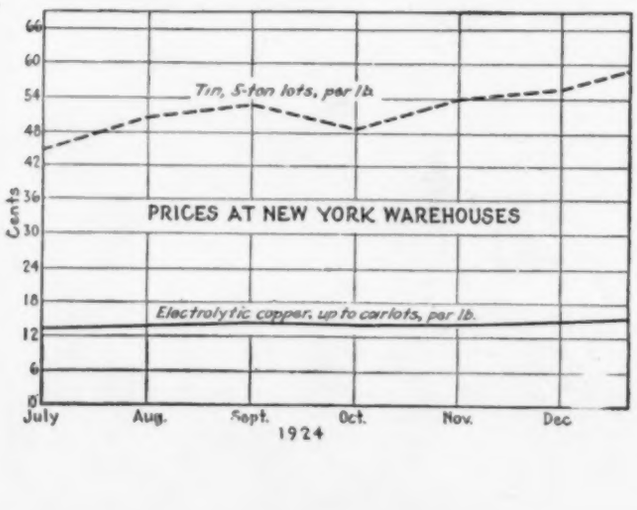
The active demand for iron, steel and the non-ferrous metals, noticeable since Dec. 1, has not as yet affected such materials as soft-steel bars, cast-iron washers, steel shapes, tin plates, wrought-steel pipe and seamless steel tubing.

Cold-drawn steel, fabricated brass and copper, cotton waste, lard cutting oil, rivets, bolts, nuts, etc., have all advanced or developed firmness in the last thirty days.

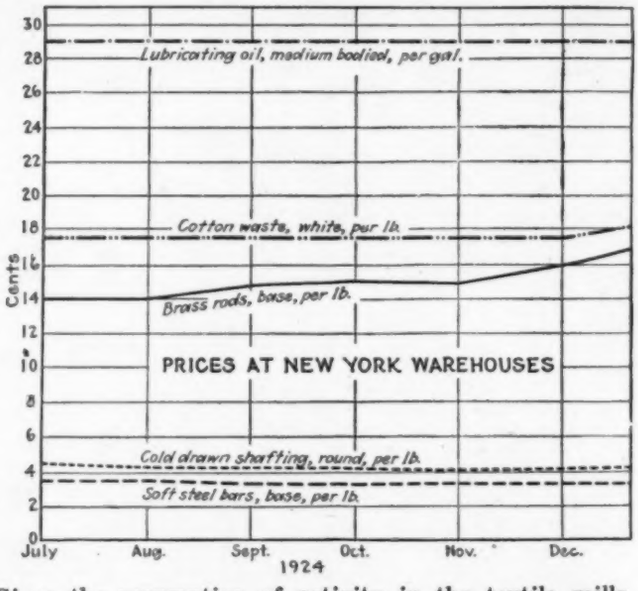
Soft-steel bars were being sold at $3.34 per 100 lb. at New York warehouses during July and August, 1924. The price dropped 10c. per 100 lb. in September and has since remained at that figure despite a heavy demand for steel, which developed meanwhile. Cold-drawn steel was one of the first items to react to the upward swing in steel prices generally. Round shafting or screw stock was $4.40 per 100 lb. at New York warehouses in July. It dropped to $4.15 in August and declined again to $4.05 in November. During the last month the price has advanced to $4.15 per 100 lb. The price of flats, squares and hexagons, normally about 50c. per 100 lb. higher than round, has followed practically the same moves as shafting since July.

Brass rods may be taken as characteristic of the other fabricated brass and copper products, such as sheets, wire, bars, tubing, etc. Brass rods, base size, were 14c. per lb. at New York warehouse in July. The price rose to 14¾c. in September and then to 15c. in October. A slight drop to 14⅝c. occurred in November followed by a rise to 16½c. in December. The price is now 17⅜c. per lb.

Solder is another material sensitive to fluctuations in the non-ferrous metals market. Solder, half and half, case lots, was 34⅜c. per lb. six months ago at New York. The price rose to 36½c. in August and then to 38½c. during the month following, but dropped back to 38c. in October, 1924. In November the quotations hovered between 38 and 39c. and have ranged from 40 to 41c. per lb. since the first of December.



Cotton waste, white, sold in New York at 14 to 21c. per lb. during the last half of the year just closed.



Since the resumption of activity in the textile mills, beginning with the new year, the price has risen 1c. per lb.

Cast-iron washers are $6.50 per 100 lb. for immediate delivery from New York warehouse. This price has remained unchanged during the past year. The same stability has characterized abrasives, lubricating oil and leather belting during the past six months. Emery cloth disks, 6-in., No. 1, are $3.38 per 100 lb.; machine and engine lubricant, medium bodied, is 29c. per gal. in wooden barrels; and the discount on medium grade leather belting is 40-2½ per cent from a list price of 24c. per lin.ft., per inch of width, for single ply.

Lard cutting oil, about 25 per cent lard, remained at 55c. per gal. during the last six months of 1924. Since then the price has advanced to 60c., f.o.b. New York.

Machine bolt discounts were around 50 per cent from list between July and October, 1924. The discount since Nov. 1 has been not more than 45 per cent. While discounts on rivets, washers, bolts, screws, belting, etc., have not been actually reduced during the past month, there is greater adherence to the published schedules with little or no cutting under, even for large quantity orders.

The eleven materials enumerated, on a New York warehouse quotation basis, have experienced practically the same changes, during the six months period, in the other important industrial centers such as Cleveland, Chicago, Cincinnati and Detroit.

News of the Week

S.A. E. Celebrates Silver Anniversary of the Automotive Industry

Harry L. Horning elected president for the ensuing year

The Society of Automotive Engineers celebrated the twenty-fifth anniversary of the automobile industry with a dinner to which 1,000 members and guests sat down in the grand ballroom of the Hotel Astor in New York on Jan. 8. The retiring president, Henry M. Crane of the General Motors Corporation, presided and Charles F. Kettering, General Motors Research Corp., acted as toastmaster. The speakers were Dr. A. E. Morgan, president of Antioch College; Col. Leonard P. Ayres, vice-president Cleveland Trust Co.; the new president of the Society, Harry L. Horning; and Strickland Gillilan of Baltimore.

During the short business meeting that opened the proceedings, R. E. Plimpton, *Bus Transportation*, reported for the tellers of election that the officers for the ensuing year would be: Harry L. Horning, president; T. J. Litle, first vice-president; H. D. Church, second vice-president representing motor car engineering; O. B. Zimmerman, second vice-president representing tractor engineering; P. G. Zimmerman, second vice-president representing aeronautic engineering; C. A. Carlson, second vice-president representing marine engineering; C. F. Scott, second vice-president representing stationary and internal combustion engineering; members of council to serve two years, C. H. Foster, O. M. Burkhardt and E. P. Warner; and treasurer, C. B. Whittelsey.

Dr. Morgan drew a sharp distinction between what he called the universals and specials of education, saying that the colleges supply the former and the technical schools the latter. At Antioch he is attempting to supply both. He said further that on account of the tremendous increase in the knowledge of natural laws during the last 100 years a study of science is now imperative. The greatest boon to mankind during the last 1,500 years has been the acquisition of the scientific method of thinking.

Col. Ayres gave statistics of the automobile industry to prove that the potential market is steadily narrowing as the average life of the car increases. He said that the reason for the astonishing growth of the industry is due to the increasingly competitive nature of the product. Those who have no car want one, and those who have cars want better ones. He predicted a prosperous business year and an automobile production of 3,600,000.

Railroads Should Enjoy Prosperous Year, Officials State

Large expenditures will be continued during next twelve months

Railway executives who have commented upon the railway situation as it appears to them for 1925 are generally agreed that the new year will probably set a new high-water mark in traffic. Their confidence in the new year is based upon the success which has attended the carriers' efforts in the last few years in overcoming conditions hanging over from the railways' financial débâcle incident to the war, and more particularly the achievements of the roads during the last two years.

The situation has received the consideration and study of the executives from various angles, such as service and the records that are classified with it; facilities as these have been enlarged or rehabilitated; rates, which executives do not expect to be reduced as a general proposition; earnings, which admittedly show much promise but have not yet given the roads a fair return on their investments, and the labor question, which has proved to be always a latent issue if not an active one.

Notwithstanding the difficulties presented by the traffic of 1924, the railroads established eight new high records in the following, which are listed by the Committee on Public Relations of the Eastern Presidents' Conference:

The total number of cars loaded in a single week.

The number of cars loaded with grain and grain products in one week.

The number of cars loaded with merchandise and less-than-carload freight in one week.

The number of cars loaded with miscellaneous freight in one week.

The number of freight cars moved in one day.

The number of ton miles of transportation produced in one month.

Transporting more of all commodities except coal, coke and ore.

Carrying peak loadings with a surplus of cars in reserve.

There is said to have been practically unanimous agreement among shippers that railroad service in 1924 surpassed all previous performances.

The rehabilitation of cars and locomotives that was begun on a broad scale in 1922 has been continued. It has not quite equaled that of 1923, but it was far in excess of any other year since 1917. Since 1921 the railroads have bought more than 500,000 new freight cars and about 8,000 of the most powerful locomotives, at a cost of about $1,600,000,000. The year also saw a substantial increase in the amount of capital expenditures devoted to additions and betterments to fixed property. Authorized expenditures of this kind were over $563,000,000 for 1924, compared with $377,000,000 in 1923.

S. A. E. Winter Meeting Jan. 19-22

Although not many of the papers to be delivered at the Annual Winter Meeting of the Society of Automotive Engineers to be held in the General Motors Building, Detroit, Jan. 19-22 relate directly to production matters, there will be something in all of them of much interest to production engineers and designers. There are to be ten separate sessions on Tuesday, Wednesday, and Thursday devoted to chassis, bodies, balloon tires and steering mechanisms, aircraft engine development and all-metal airplane design and construction, air-cleaner and oil-dilution investigations, engine vibration and research instruments and apparatus.

An address by E. G. Budd and J. Ledwinka on "All-Metal Automotive Body Design and Construction"; one by F. F. Chandler and H. A. Huebotter on, "Forces and Stresses in Steering Mechanisms"; another by C. E. Summers on, "Measurment of Engine Vibration"; and that on, "Foreign Material in Engine Oil and its Effect on Engine Design," by G. A. Round, contain much valuable information for the designer.

Will Study Aircraft Situation

The appointment of a committee to study the whole aircraft situation has been announced by the American Engineering Council. The chairman is Joseph W. Roe, professor of industrial engineering at New York University.

The Business Barometer

This week's outlet in Commerce, Finance, Agriculture and Industry based on current developments

By Theodore H. Price
Editor, *Commerce and Finance, New York*

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ON the evening of New Years two grand opera stars sang into the radio. Applied to their outstanding capitalization the next day's advance in the radio securities dealt in on the New York Stock Exchange and the Curb was the equivalent of more than $10,000,000.

The incident bespeaks the present spirit of speculation. The New York Stock Exchange is the best advertised institution in the world. The publicity given it probably exceeds that accorded the Federal Government. There are 2,441 daily newspapers in the United States. Many of them carry columns of Stock Exchange news and quotations. Just at present most of them are printing special stories in which the unusual activity of the stock market is featured and glorified.

These 2,441 papers have a total daily circulation of 66 million copies. Therefore 66 million readers are now having their attention directed to the boom in stocks. Of course they are not all speculating. If they were twenty stock exchanges could not handle the business and the country would be distraught. But the war and the distribution of the Liberty Loans worked an enormous increase in the number of those who have a superficial knowledge of the financial markets and millions who were formerly ignorant of stocks and bonds are now trading in them.

The result has been an almost uninterrupted advance that promises to continue until something happens to change public sentiment. Just when that something will happen and what it will be no one can say. The list of possibly untoward events is a long one. Normally the advance already established would have led to an advance in interest rates that would have acted as a brake upon speculation.

Just before Christmas the money market was rather firmer and the statement of the Federal Reserve Banks published Dec. 26 showed a loss of gold and a decline in the reserve ratio that were impressive. But the Federal Reserve statement issued last Friday indicates a gain of $14,000,000 in gold, a reduction of $140,000,000 in "earning assets" and a contraction of $57,000,000 in the circulation outstanding.

Chiefly as a consequence of these changes the reserve ratio is up to 74.6 per cent and the stock market is boiling again in the belief that "easy money" is assured for a long time to come.

It seems unnecessary to add fuel to the fire by emphasizing the many encouraging developments that have prompted the buying of stocks. The ease with which $125,000,000 telephone bonds were sold is an example. The argument is that this money has been borrowed to be spent and that its expenditure will quicken industry and improve business.

The same argument applies in the case of many other large loans already placed or soon to be offered. The reasoning seems logical and it has already been vindicated in the market for iron, steel, copper, lead and zinc. They are all higher and the steel mills are now said to be working at 80 per cent of their capacity, chiefly on orders placed by the railroads, the public utility companies and the other large corporations who have found it so easy to borrow.

In America it is a tradition that the steel industry is the best barometer of business, but when we get away from steel and the other metals now used so largely in electrical work it becomes a question of whether the individual consumer is able or willing to increase his purchases on the scale that the advance in the stock market presupposes. Thus there has been a general reduction in the price of automobiles; the December production was much below last year and it is said that the manufacturers are not counting upon any great increase in the demand during 1925.

Then there is the textile industry. The domestic market for cotton goods is disappointing. Wages in the New England cotton mills have been or will be cut by an average of fully 10 per cent and the manufacturers of woolen goods are far from cheerful over the outlook.

In the retail trade the Christmas business was not up to expectations. In many cities it was below last year and the post-holiday demand for staple goods is poor because necessaries rather than luxuries were bought as Christmas gifts. Perhaps there will be a change for the better when the money that is now being borrowed in such huge blocks finds it way into the pockets of the wage earners, but the process of distribution is slow and the merchant who is not speculating in the stock market will probably find watchful waiting the safest policy to pursue until he can see more clearly ahead.

This is the picture. In the background there is the advancing stock market. In so far as it is rational it seems to be discounting a great commercial revival that is made somewhat doubtful by the high prices at which most commodities are already selling.

It is probable that a majority of those whose business experience antedates the war will continue to think that the price level is too altitudinous to be safe, while the younger generation insist that we are in a new era in which values will be doubled because the purchasing power of money will be halved.

What's Doing in Industry

Not only did the railroads buy machine tools during the past week, but all industrials were in the market giving impetus to what may be a record month for the past year in machinery and machine tool sales. Reports from various sections of the country show that buying was general with the possible exception of Buffalo, and a temporary and well explained falling off in orders in the Detroit district. Motor shows and inventories must both be completed before heavy ordering of equipment commences, according to Michigan dealers.

Most of the Eastern railroads have ambitious programs of purchase with lists going forward from the New York, New Haven and Hartford, the New York Central, and purchases reported from the Lehigh Valley R.R. and the Delaware and Hudson R.R.

Another source that has shown interest in the machinery market is the electric companies that have extensive plants in the East. Further buying for the Western Electric Co.'s new plant and purchases of single orders for the General Electric Co.'s Schenectady plant are reported.

The development of automobile production in Bridgeport, Conn., augurs well for machinery and machine tool men, but otherwise nothing except necessities are expected to be purchased by automobile builders in the East.

Exporting will show large gains for the past year when the official report is made public, it is asserted, and exporting for the coming year is expected to exceed any previous figures.

The Industrial Review

Progress of the machinery and machine-tool business in various parts of the country

THE following reports gathered from the various machinery and machine tool centers of the country, indicate the trend of business in these industries and what may be expected from the future:

Detroit

Eyes of machine tool and machinery leaders in Detroit are focused at the present upon the national automobile shows, the meetings of the Society of Automotive Engineers scheduled for Detroit in connection with the annual auto show the middle of the month, and upon the announcements of new models, changes in design, and of additions to plants now occupying so much space in the public press.

Special machinery appears to be more in demand than standard equipment, machine tool men say. Some few inquiries for lathes, drills, and similar machines are being received, but by far the larger portion is composed of special jobs. This differs materially from December when the ratio was reversed.

New York

New York machinery and machine tool dealers report better business so far this month than they have enjoyed for more than a year. December to some New York dealers was the best month of 1924, and January is proving to be all that was anticipated.

Railroads are both inquiring and buying. Orders have been received from the Lehigh Valley R.R. and the Delaware & Hudson R.R., with inquiries from the New York Central, the New York, New Haven & Hartford R.R., and the C. & O. R.R.

Most dealers report that business has been good generally and that the totals do not depend upon any one source. General industrials, the electric companies, the automobile and automobile accessories builders and the railroad have all been contributing their share.

New England

Buying is on the increase in the New England machinery centers and is widespread, being reflected practically in all parts. The source of the buying is about evenly distributed among railroads, automotive industries and electric equipment manufacturing companies.

The railroad buying is of considerable volume with companies in the Bridgeport, Hartford and Worcester centers reporting. Some of it is for heavy machinery of the automatic and labor-saving type and buying in other localities has been of small tools.

The automotive industries have been buying heavily in the New Britain, Hartford and Waterbury localities. This buying has been of automatic machinery.

While the electrical industry orders are for the most part for domestic use the amount that is intended for foreign use is of such a volume as to make it commented upon.

The export buying has been for shipments to continental countries. In this connection a manufacturer commented that there has been a noticeable increase in inquiry business ultimately leading to German deliveries.

In the Waterbury district there has been a most encouraging amount of orders received and employment is on the increase in shops. Hartford manufacturers, too, are adding to working forces slightly. There is reported to be a demand for machinists in Stamford. Papers in several localities are now carrying advertisements for skilled mechanics in the machinery trade.

Chicago

The Chicago tool machinery market during the last week, although not active so far as orders are concerned, continues to show every indication of good business prospects materializing within the near future. It had not been expected that the first half of January would develop more than the average demand for the period.

Inquiries are being received in greater number than at any time for several months, and dealers are confident that the general forecast of greatly improved trade will be borne out. The Crane Technical School of Chicago has within the last ten days placed orders for new equipment amounting in the aggregate to a fairly large sum.

Manufacturers of coal mining machinery report demand for their special lines as only fair, but anticipate an improvement as soon as general industrial conditions throughout the country reach a stage of bigger production.

Buffalo

Inquiries still continue to be plentiful in the Buffalo machinery market. The fact that a real buying movement has not developed at this time is not at all disconcerting as most of the machine tool men feel that it is too soon after the first of the year with its attendant inventories and annual work to be productive of orders.

There has been some slight casual buying of quite unimportant items, but nothing of definite importance to report with the exception of equipment for highway snow-cleaning purposes.

The Wheeler-Murray Co., specialists in road-building and maintenance equipment, have opened a tractor division in charge of F. A. Fisher. The sale of five Bear tractors has been made during the last few days by this company, the purchases being made by communities near Buffalo which have established programs aiding in keeping the main trunk line highways open and free from snow throughout the winter. At the present time it is pioneering the business in this section and will doubtless reap the benefit accordingly.

There have been some recent inquiries regarding cranes that will probably mean some buying in the near future, or at least in the spring and early summer months although there is nothing definite to report at present.

Canada

Developments of the past two weeks indicate that the machinery and machine tool business of Canada has entered upon the new year under the most favorable auspices. In place of the usual inventory time decline, buying has been rather brisk in practically all lines. The general concensus of opinion is that prospects are bright for an early improvement in the demand for machine tools.

All signs point to a revival of the implement demand in Western Canada.

Then, too, there is likely to be a good demand before long for railroad materials for rehabilitating the tracks of western Canada. The railways are talking of laying 100 lb. rails to take care of the heavier equipment now in use on main line tracks. An order for rails has recently been received by the Algoma Steel Corporation from the Canadian National Railways.

Exports of automobiles made in Canada are increasing. In November this year, 4,352 passenger automobiles were exported compared with 3,907 in November, 1923. A notable feature has been the exports of automobiles to Germany. This was practically all new business for Canadian car manufacturers, because in the corresponding period in 1923, less than ten cars of Canadian manufacturer were marketed in Germany.

Auto Parts Now Up for Simplification

Initial steps for the reduction of the present diversity of brake linings, spark plugs, and piston rings were taken at a meeting under the auspices of the Division of Simplified Practice, Department of Commerce, which brought together representatives of engineering groups, manufacturers and others from virtually every automotive center in the United States. In each case the action by the conference led to the specific problems being referred to the Society of Automotive Engineers for investigation and the promulgation of standards to meet some of the problems; while still other phases were referred to the same body for extensive studies which will have to be taken up at later meetings.

Personals

JAMES W. HOOK, formerly president of the Allied Machinery Co. of America and for the past year president and treasurer of the Geometric Tool Co. of New Haven, Conn., has purchased the control of the latter company which was formerly held by the late Howard E. Adt.

CHARLES H. LOGUE has resigned as consulting engineer for the Brown-Lipe-Chapin division of the General Motors Corporation, Syracuse, to open an office as a consulting engineer specializing in matters pertaining to gears.

GEORGE H. GRUNDY, manager of the steel sales for Peter A. Frasse & Co., New York, will go to Hartford, Conn. to take charge of the tool steel and hot rolled alloy steel department in the old plant of the Frasse Steel Co., recently sold to the Union Drawn Steel Co., Beaver Falls, Pa. Under the terms of the sale, Peter A. Frasse & Co. did not dispose of this part of the manufacturing business but will continue to anneal and certify tool steel and heat treat alloy steel as well as distribute these products and the cold drawn products of the Union Drawn Steel Co. through the New York, Philadelphia and Buffalo warehouses.

SAMUEL WILLIS, an employee of the wire and cable department of the General Electric Co., Schenectady, N. Y. has received the highest award yet made by the company. The award which was for $1,000, was given for a suggestion resulting in an improvement in making paper insulated cable.

A. T. RANKIN, formerly New England representative of the Amco Manufacturing Co., has joined the sales force of the Oakes Co. of Indianapolis, manufacturer of automobile accessories, and will have charge of the territory embracing the Middle-Western states.

L. H. HAZARD has been appointed factory manager of the George W. Davis Motor Car Co., Richmond, Ind. He was formerly production manager of the Velie Motors Corporation, Moline, Ill.

A. H. MADDOX, who has been identified with the machinery business in the Southeast for some years, has been appointed assistant sales manager of the Woodruff Machinery Co., of Atlanta.

A. V. BODINE has been elected vice-president of the Dictaphone Corporation, Bridgeport, Conn., and will continue to be actively in charge of production. Mr. Bodine has been assistant to the president and head of manufacturing.

H. M. CREE has been appointed sales representative for Texas and Oklahoma for the Cincinnati Ball Crank Co., Cincinnati, Ohio. His headquarters will be at 5,507 Miller Ave., Dallas, Texas.

E. C. DEVILLAVERDE has joined the organization of the United American Metals Corporation, Brooklyn, N. Y.

JAMES LITHGOW, formerly with the Allis-Chalmers Co., Milwaukee, Wis., has become mechanical engineer for the Commercial Solvents Corporation, Terre Haute, Ind.

WILLIAM F. BIGGS is now machine designer with the J. P. Devine Co., Buffalo.

W. C. CASSON has joined the Cadillac Motor Co., Detroit, as a designer in experimental work.

DON R. FORSYTHE has been appointed assistant manager of sales by E. C. Atkins & Co., Indanapolis. He succeeds LEW DOSTER.

HARRY H. MINER, European representative for the Landis Tool Co., Waynesboro, Pa., returned recently to France on the S.S. Paris, after a business trip of several weeks in this country.

Obituaries

SAFFORD S. DE LANO, treasurer and a director of the American Car & Foundry Co., New York, died recently at his home, 137 Riverside Drive, New York City.

CHRISTIAN KIECHLER, aged 88 years, founder of the Kiechler Manufacturing Co., Cincinnati, Ohio, died recently in that city. He was an authority on steel treating.

JOHN DOUGLAS CHERRY, aged 50 years, died at his home in Wethersfield, Conn., Jan. 4, following two years' illness with a complication of troubles. Mr. Cherry came here nine years ago from the west to become president of the Roto Co., manufacturers of boiler appliances.

HENRY W. JACOBS died recently at Atchison, Kan. Mr. Jacobs was a consulting engineer of Chicago and was formerly well known as a railroad engineer being assistant superintendent of motive power of the Atchison, Topeka and Santa Fe. R.R. and at one time president of the Oxy-Weld Railroad Service Co., Chicago.

JAMES T. MCCLEARY, formerly secretary of the American Iron and Steel Institute, died recently at La Crosse, Wis.

GEORGE BURKHARDT, president of the Champion Welding Co., Buffalo, died recently in a sanitorium in Detroit.

Business Items

Engineers for the Fiat Co. of Turin, Italy, have returned following a visit to this country where orders were placed for various machine tools to be used in Italy.

The Hartford Tube-Products Co., Hartford, Conn., has voted to liquidate its business and to dissolve the corporation. All buildings, real estate and tools have been offered for sale.

The Peerless Alloy Co. will open its new factory at West Colfax and Osage Sts., Denver, Col.

The Dalton Malleable Casting Co. of Warsaw, Ind., has changed its name to the Dalton Foundries, Inc.

Arrangements are being made for moving the plant of the Hartford Foundry & Machine Co., Hartford City, Ind., to Montpelier, Ind., to be consolidated with the plant of the Montpelier Manufacturing Co.

The Canada Machinery Corporation, of Galt, Canada, has just concluded with Joseph T. Ryerson & Son, Chicago, an arrangement to manufacture and sell in Canada the Ryerson lines. The Galt company has for some time been closely associated with the Ryerson company.

The Universal Machinists, Inc., has opened a machine and grinding shop at 1136 Broadway, Denver, Col. M. L. Ord is president.

The Woodruff Machinery Co., of Atlanta, Ga., distributor of general equipment and tool lines in the Southeast, announces the removal into larger quarters at 92 South Forsyth St.

The Curtis & Marble Machine Co., of Worcester, Mass., announced the latter part of December that the company would shortly open a Southern office in Greenville, S. C., for the distribution of its line of textile machinery and equipment.

The Diamond Power Specialty Corp. of Detroit, Mich., has appointed the Midwest Machinery Co., 104-106 So. Main St., St. Louis, Mo., as its representative for the territory of Missouri, adjacent to St. Louis, south of and including Springfield and Decatur, Ill.

Forthcoming Meetings

American Society for Steel Treating. Winter Sectional Meeting under the auspices of the Cincinnati chapter. Thursday and Friday, Jan. 15 and 16, in Cincinnati.

Society of Automotive Engineers. Annual Meeting. Detroit, Mich., Jan. 20, 21, 22 and 23. C. F. Clarkson, 29 W. 39th St., New York City.

American Management Association. Annual Convention. Hotel Astor, New York City, Jan. 28, 29 and 30. Headquarters, 20 Vesey St., New York City.

Southern Supply & Machinery Dealers' Association and the American Supply & Machinery Manufacturers Association. Joint Convention. The Atlanta-Biltmore Hotel, Atlanta, Ga., May 5, 6 and 7. F. D. Mitchell, secretary-treasurer, 1819 Broadway, New York City.

The Society of Industrial Engineers. National Convention. Hotel Winton, Cleveland, Ohio, May 6, 7 and 8. Executive secretary, George C. Dent, 608 S. Dearborn St., Chicago, Ill.

American Society of Mechanical Engineers. Spring Meeting. Milwaukee, Wis. May 18, 19, 20 and 21. Calvin W. Rice, secretary, 29 West 39th St., New York City.

Society of Automotive Engineers. Summer Meeting. Greenbrier Hotel, White Sulphur Springs, W. Va., June 16, 17, 18 and 19. C. F. Clarkson, secretary, 29 West 39th St., New York City.

American Society for Testing Materials. Twenty-eighth annual meeting. Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., June 22, 23, 24, 25 and 26. C. L. Warwick, secretary-treasurer, 1315 Spruce St., Philadelphia, Pa.

National Foreign Trade Council. Annual Convention. Seattle, Wash., June 24, 25 and 26. O. K. Davis, secretary, India House, Hanover Square, New York City.